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Observations
ON
GUNSHOT WOUNDS OF THE HEAD.

BY
COLONEL H. M. W. GRAY, C.B., A.M.S.(T.C.),
CONSULTING SURGEON, BRITISH EXPEDITIONARY FORCE.

In view of publications on this subject which have appeared in the medical press from time to time since the beginning of the war, it seems desirable to define the principles and practice followed, almost without exception, by the surgeons at work in the military hospitals in R——. These principles may be enunciated shortly as follows: We believe

That infected gunshot wounds of the skull and brain require more careful consideration and prompt attention than similar wounds of any other part;

That we can combat and prevent sepsis best by early and complete operations;

That we can prevent permanent disability in most cases by systematically removing foreign material or displaced bone from the surface or substance of the brain whenever these are accessible to legitimate surgery;

And further, that, by these precautions, the immediate results in the saving of life and more rapid restoration of function, when that is possible, are better than those obtained by more conservative procedures.

All experience has shown that the brain, sooner or later, resents the presence of any abnormality in its immediate coverings or in its substance. It is true that some small lesions of the skull or small foreign bodies in the brain have caused apparently no trouble to the patient, even after years have passed, but others, seemingly equally insignificant, have caused intolerable inconvenience, due to late effects on the brain, which removal of the exciting cause has not succeeded in relieving. This is more true, of course, in cases of actual lesion of the brain. It is rather sad to think of the number of men injured in the head during the South African war who afterwards became a burden to the State owing to derangements of the brain, and it must be remembered that the maiming effects of sepsis in that campaign were not apparent to anything like the same extent as in this one.

It has always been the aim of military surgeons to remove or ameliorate the physical defects produced by missiles. Removal of displaced bone, of foreign bodies, of blood clot, or of any substance which might interfere with rapid and smooth healing of the brain has been considered to be of the utmost importance no less than the combating of sepsis. We have discovered in this campaign no valid reason to depart from this line of thought. The immediate effects of sepsis, both in increasing the severity of the focal lesion and in causing diffuse inflammation of the brain and its coverings, have been impressed on our minds with dreadful force. The power of the brain to accommodate itself to extraordinary conditions, or, one might say, the power of one part of the brain to disregard even excessive injury of another part so that what is left "carries on" in a marvellous way, has also been very striking. But who can foretell that, later on, such cases are to be free, as never before, of sequelae which experience has shown to be so frequently inevitable?

Because of that experience and because no one can foresee how soon trouble will arise, it is surely right that we should do all in our power to prevent probable trouble. It is a matter of the greatest importance to establish the best method of preventing or eradicating sepsis, which is such a hindrance both to rapid healing and to successful attack on physical defects in the skull or in the brain. One is not justified in formulating rules which are based on results of operations performed at a period in the war when methods of dealing successfully and rapidly with infected wounds were not properly appreciated. It has been found that septic wounds of the scalp and skull are particularly easy to deal with when compared with others in that they can usually be completely excised, and the scalp sutured without danger. One might almost say that this procedure, in the hands of those who have mastered the necessary technique, has robbed operation of its danger and has enabled surgeons to obtain results which compare favourably with those of equal magnitude in civil practice under ordinary aseptic conditions. These remarks do not apply, of course, to cases in which sepsis has already obtained a firm hold in the lacerated brain. The problems connected with such cases are much more difficult. Apparently success is then dependent chiefly on the provision of suitable drainage—a very easy thing to say!

Fragments of bone, when driven into the brain, are not usually septic at first, but tend to become infected fairly rapidly. Jagged pieces of shell almost invariably carry infection along with them. If large pieces lodge in the brain, results are very bad. Very small pieces, on the other hand, may not cause any trouble, but even they have been found sometimes surrounded by large abscesses.

While it is evident that the thorough removal of physical defects is desirable at as early a date as possible, there are objections to this, of which the most important is that patients do not travel well until at least a week or ten days after operation. During a period of active fighting they cannot be kept at the front, and therefore it would appear best that all except the most serious cases should be sent at once to the bases, so that they may arrive before sepsis has got a firm hold. At the front nothing should be done to the wound further than to remove any visible foreign material, to antisepticize the surrounding scalp, and to apply a suitable dressing. To judge from experience in Rouen, it would seem advisable that, if any operation has to be done at the front, it should be a complete one. Second operations appear to entail a greater risk, taken all over, in these cases than a complete primary one. The average case arrives at the clearing stations really in a less septic condition—although the wounds may be superficially badly soiled—than they do at a base, and results should on that account be more favourable.

The following remarks have, of course, no reference to very severe wounds caused by large pieces of shell, in which such an extensive part of skull and brain is blown away or where a rifle bullet causes such explosive intracranial effects that the patient does not survive more than a few hours.

We have seen many patients who on admission have been suffering from complete hemiplegia, and whose symptoms have cleared up in such a marvellous and rapid way after operation that only a negligible amount of paresis has persisted. On the other hand, we have seen cases who showed few or no symptoms, but who later developed serious complications and died rapidly, in spite of operation. It appears, therefore, that one ought not to pay too much attention to focal symptomatology as a guide to treatment, or even, in many cases, to prognosis.

We have seen many cases with extensive superficial injuries with little or no damage to the brain, and, on the other hand, many cases in which an insignificant looking wound of the scalp and skull was associated with most extensive injury to the brain. Whilst large, lacerated wounds are usually most septic and suppuration in the brain apt to be severe, yet we have seen cases of trivial and comparatively clean-cut wounds of the scalp to be associated with extensive fracture, and, after a few days, with such acute suppuration in the brain that only immediate operation saved the patient's life. The size or condition of the wound, therefore, is no indication of how the case will behave.

One is told that oedema of the brain, and shock or concussion accompanying a serious injury, are such that operation at an early stage is dangerous. Yet we hear of many patients who are brought into clearing stations in practically a moribund condition who, after immediate operation, in a few hours have so far recovered that they are able to speak intelligently and take food. Their injuries heal up perfectly well afterwards. It would thus appear that oedema and so-called shock are no bar to success. Indeed, it is likely that both oedema and shock will pass off more quickly when the physical defects are remedied—all the sooner the more thoroughly this is done. In wounds of other parts, oedema and tension due to interference with the circulation are relieved very rapidly by incision, removal of foreign material, and drainage. How much more must relief of the circulation be called for in a closed box like the skull! In serious cases delay does not, therefore, seem advisable.

In passing, one may be permitted to draw attention to the value of local anaesthesia for many of the cases. The solution need be injected only into the scalp tissues and pericranium. The skull, dura, and brain will thereafter be found to be insensitive. If adrenalin is mixed with the solution, bleeding from the scalp is reduced to a minimum.

After consideration of all these facts we are driven, in deciding upon a course of action, to pay more attention to the probable mechanical effects of the injury and the potentialities for infection rather than to worry much over the presence or absence of definite symptoms. The lesion is a traumatic one, the possibility of sepsis is great, and things should not be left to chance or until the development of some particular symptom. One must risk misinterpretation when one says such things. One does not wish in the slightest to depreciate the value of clinical investigation. Timely and effective operation does not interfere with that. There is no doubt that the lesions one has to deal with are chiefly mechanical and microbic, and must be treated by mechanical and antimicrobic remedies. If the mechanical disabilities are not relieved, the complicating infection has potentialities greater and more serious than in wounds of other parts.

Minor Operations.

Excision and suture of scalp wounds are said by some to be unnecessary. Such a judgement depends on the point of view. These excisions, while they do no harm when proper technique is employed, make the patient fit for duty again in a much shorter time; they establish a diagnosis of fracture in most cases with absolute certainty; there is no doubt that thereby they occasionally save life, they certainly prevent troublesome sequelae; they save time and trouble on the part of the attendants, and they save expense in dressings. (The original mastic and gauze dressing may be left until the wound is healed.[1]) Captain J. E. H. Roberts, recording 207 cases of excision of scalp wounds, states that only in 8 did failure to obtain healing by first intention occur. One wound gave way completely. In the others, slight gaping, sloughing, or stitch suppuration occurred.

Reasons for Opening Apparently Unwounded Dura.

It has been shown repeatedly during this war that a pronounced depressed fracture of the inner table, although the dura may not be lacerated, is accompanied by a localized, usually more or less cone-shaped, bruising or pulping of the underlying brain. The base of the cone corresponds roughly to the area of comminution of the inner table. Owing to its elasticity the inner table must always be depressed considerably before it fractures, and the sudden localized blow on the brain causes the pulping. The amount of depression necessary to cause fracture varies in different parts of the skull. Such injury to the inner table and brain may exist without a trace of injury to the external table. In very rare cases intracerebral haemorrhage, sufficient to cause severe pressure symptoms, may occur.

The pulped area—a mixture of useless brain matter and blood—is an *immediate* source of irritation to the surrounding brain, because it is virtually a foreign body. In the process of healing a great part of it is replaced by "fibrous" tissue—a scar—which forms a *remote* source of irritation. The pulped mass is liable to become infected and to form a localized abscess or to lead to spreading encephalitis or meningitis, especially if the wound superficial to it is not rendered aseptic at an early date.

In cases where the force has been so great that the dura has also been ruptured, although pieces of bone have not penetrated, a definite pulped track, extending even for a couple of inches into the brain, may be found. This, when explored by the finger, resembles closely the track made in the brain by a foreign body. This shows the necessity for using *x* rays before operation to reveal whether or not a metallic foreign body is present. Operation should not, however, be unduly delayed in order to have this done. If the foreign body is beyond the reach of the finger, it is usually beyond the reach of legitimate surgery. By fitting together the fragments of the inner table one can often ascertain, with fair accuracy, whether any fragments of bone have been forced into the brain.

The mass of disintegrated brain matter and blood, whether on the surface or in the depth of the brain, interferes with the local circulation, and by this alone causes irritation similar to a solid foreign body. After its removal from either situation, pulsation usually returns at once.

Such lesions may be accompanied by persistent headache, focal epilepsy or paralysis, or even "optic neuritis." Their presence can usually be recognized, after the dura has been sufficiently exposed, in that the dura is somewhat discoloured, the brain does not pulsate freely, and the area feels doughy instead of elastic or springy.

When the dura is opened, the pulped material wells out like grease from a collapsible tube. Pulsation returns very quickly. If healthy brain matter is forced out, this indicates excessive intracranial pressure, and lumbar puncture or a decompression operation should be done at once. A small drainage tube, down to the hole in the dura, may be left in the wound for twenty-four hours. The dura is usually opened by a small crucial incision made by plunging the knife in for half an inch or so, at right angles to the surface of the brain. It is sometimes necessary to help out the pulped material by inserting a small forceps and carefully opening the blades.

Symptoms are usually relieved within a very short time. This relief is often most striking when the dura is opened at a second operation, the first (removal of depressed bone) having failed to relieve the symptoms.

In the hospitals the dura has been opened deliberately on more than fifty occasions, without fatality. The effect has been immediately and uniformly beneficial. In *four* cases in which the operators thought that the procedure was inadvisable, death occurred from abscess of the brain, spreading encephalitis or meningitis.

Operations where Wounds of the Blood Sinuses are Present.

These are done as a matter of course, because it is thought advisable to remove depressed fragments of bone—

(*a*) Which cause obstruction to the return of blood from any part of the brain, and

(*b*) Which may be, or may become, soiled, and cause septic thrombosis. It seems all the more desirable to remove such fragments if they actually penetrate the wounded sinus. The operation is, *per se*, not a dangerous one if proper technique is employed. For example, fourteen cases from the recent fighting were operated on. Only one died, and he had severe laceration of both cerebral hemispheres, besides the wound in the longitudinal sinus.

DRAINAGE OF THE BRAIN.

It is difficult to formulate any hard and fast rules about drainage of the brain. On the whole, it is probably best not to drain unless one is forced to do so. The presence in the brain of definite pus, of infected blood clot, of inaccessible, definitely infected foreign bodies, or of profuse oozing from a seriously lacerated area are the chief indications for it. If when operating some days after receipt of the wound it is found that pus is absent from a track which foreign bodies have made, it is usually unnecessary to drain. In some cases one may feel, however, that it is safer to insert a short drain for twenty-four hours or so. When aseptic foreign bodies, such as bone fragments, have been extracted, or when an area or track of pulped brain matter has been evacuated in which no penetration of foreign bodies has occurred, it is unnecessary to drain the cavity in the brain, but a ¼ in. rubber tube should always be inserted, from the angle of the wound, "down to but not into" the opening in the dura, for twenty-four hours. If pus, "smelly" blood-clot, clothing, hair, or a jagged large piece of metal is evacuated from the depth, a drain should always be inserted into the track, and it should be brought straight out through an unsutured part of the excised wound. Bacteriological examination of what is removed should always be made, even though actual pus is absent. If streptococci are found drainage should be maintained until the organisms disappear or become very few in number. If streptococci are absent it is fairly safe to be guided, as to time for removal of drains, by clinical signs alone.

It should be remembered that foreign bodies, especially flat pieces of bone, compress the brain in front of them; therefore, although they may be found at a depth of, say, 1½ to 2 in., it is not necessary to push a drain in to that

depth. The distal end of the track will, after extraction of the foreign body, be found to have approached considerably nearer the surface of the brain. If one attempts in such a case to push a stiff drain in for a couple of inches, there is great likelihood that the lateral ventricle will be perforated by it. One should, immediately before inserting the drain, gently explore the track with the finger, and push the drain in only so far that it will not quite reach the extremity of the track.

As a rule, the drain should be shortened slightly every day or every second day unless pus continues to discharge from the depth in fair quantity. It should be borne in mind that a drain, especially a rigid one, acts like any other foreign body, and may stimulate pus formation, besides providing a channel for possible entrance of fresh infection. All drains should on this account be removed as early as possible.

Rigid drains are harmful to the brain, especially those with holes cut in them. The intracranial pressure may force normal brain through the holes or end of the tube. The constant friction of the pulsating brain against the hard foreign body must have a bad effect. The most satisfactory drain, on the whole, seems to be a piece of jaconet, batiste, or similar substance, folded concertina-wise, with small pieces of salt tablet embedded in its folds. As the salt dissolves it exerts a "hypertonic" effect on the surrounding inflamed brain. In certain cases, where the pus is particularly thick or profuse, or where streptococcal infection is present, it may be advisable to insert in addition one or two narrow tubes. Salt or "eusol" solution, of strength suitable to the infection, may be injected repeatedly, a few drops at a time, along the tube.

One must be careful, when inserting a drain, that damage is not done to the healthy brain lining the track. One must therefore note the direction of the track very carefully.

Points Constantly to be Kept in Mind.

1. There may be multiple injuries, therefore always have the whole scalp shaved.

2. The force causing the injury is usually very circumscribed, and its effects are therefore likely to be localized to the immediate neighbourhood of the part which has been struck. Injury by *contre-coup* has rarely to be considered.

3. Such localized forces, if they have been great enough to cause depressed fracture of the inner table, result, practically always, in definite injury to the brain, which asserts itself by immediate or remote cerebral disability. This may occur in pronounced form, although the dura is uninjured; in rare cases it has occurred even when no fracture of the external table has been seen. One need not refer to cases of immediate disability. Some interesting examples of remote disability have turned up already even in France. We have seen a good many cases now of men who were wounded early in the war, and whose wounds were considered so insignificant at the time that the patients were not even sent down the line. Later they were invalided on account of symptoms caused by the physical defect of the skull—to wit, depressed fracture of the inner table—which, of course, was treated without more delay.

4. Experience has shown that a properly conducted, complete operation, while it cannot undo the already existing damage to the skull or brain, facilitates repair, gives better immediate results, and tends to prevent troublesome sequelae more surely than an incomplete one.

5. Death is due, practically in all cases, to the effect of sepsis on the damaged brain. In any case sepsis will increase the amount of damage to the brain. The local injury, when thus complicated, is likely to "interfere with intellect or set up permanent paralysis." Apart from that, sepsis may cause necrosis of bone and thus prolong convalescence.

6. As our efforts will therefore be nullified in large measure unless sepsis is overcome, all operations must be preceded by removal of the sepsis from the area to be dealt with. Excision of the infected parts is the most rapid and certain way of doing this. It is only in very rare cases that this is not feasible. If it is not, the patient has probably very little chance of pulling through. The wound of the scalp and pericranium must be removed *en masse*. The fractured bone must be nibbled or trephined away. Proper technique is essential to success. It must be pointed out that to excise the wound after turning down a flap is merely courting disaster. The brain cannot be dealt with so vigorously, but removal of pulped useless material and of foreign bodies will allow it to combat more successfully any infection. "Healthy brain substance possesses considerable power of limiting microbic invasion," but one cannot say that pulped brain or brain with foreign bodies embedded in it is healthy! As already indicated, in the majority of cases in which bone fragments alone are forced into the brain, the track leading down to them is not infected at first, but it rapidly becomes so.

7. Foreign bodies in the brain act deleteriously in four ways: (*a*) By their direct effect on the delicate pulsating brain tissue. (*b*) By favouring the development of sepsis. It is practically an everyday occurrence during a "rush" to find suppuration around pieces of bone lying at the end of a track in the brain. (*c*) By interfering, in rather an obscure way, with the circulation of the brain. A mass of pulped brain matter acts in the same way. It is very common to find that the brain, when exposed at operation, does not pulsate, or does so only to a slight extent, until the fragments of bone or disintegrated matter are removed from the depth, when it begins to pulsate freely. A normal circulation is essential to satisfactory recovery. (*d*) By causing, when they become encapsuled, a localized connective tissue mass which may act as deleteriously as a tumour. If recovery of function is possible, removal of foreign bodies will procure this more certainly, more rapidly, and probably more completely than is otherwise feasible—a great improvement is frequently noted within twenty-four hours. If carefully done, further damage to the brain is not appreciable. In only one case have I seen any immediate increase of paralysis follow—when an unusually large piece of bone had to be removed from a suppurating track. One will likely do less harm to the brain in removing a foreign body through an already existing track than by cutting a way through a mass of fibrous tissue, or, worse still, healthy brain, as has to be done when the operation is postponed till the scalp has again become intact.

8. It is highly desirable to try to prevent the formation of cicatricial tissue whether on or in the brain, even though in the latter case it may resemble neuroglia. Such scar tissue acts as an irritant chiefly by preventing normal movement of the brain, by interfering with the circulation, and, in many cases, by causing pain. The nature of the injury, the amount of sepsis, the presence or absence of foreign bodies, and the treatment employed have much to do with the amount formed. Unsuitable drains, especially when kept in for a long time, stimulate its formation. The trephine opening should be covered completely with healthy scalp. It is dangerous to replace any of the fragments of bone because they are likely to be infected. The scalp wound, after excision, can usually be accurately sutured over the opening—in some cases it may be necessary to perform a plastic operation, by sliding flaps. This is greatly preferable to merely covering the exposed brain by a flap of muscle, pericranium or aponeurosis. Such a flap, if exposed at the bottom of a wound, is apt to necrose. In any case, the amount of cicatricial tissue and of permanent adhesion is greater in a wound which heals by granulation than in one which heals by first intention. It is true that Nature has a marvellous capacity for remedying defects—even by making a new dura. The greater the amount of abnormality, however, with which she has to cope, the greater will be her difficulty in imitating the *status quo ante*. Therefore we should help her in every way possible. When this help is given efficiently, the wound responds by healing *per primam*. The surgeons who have kept statistics will support the statement that, in patients who recover, at least 90 per cent. of the wounds behave in this desirable way.

TREATMENT.

Objects.

The objects of our treatment can now be shortly summed up.

1. To prevent or remove infection, thereby preventing further destruction of tissue.
2. To establish diagnosis in some cases of doubt.
3. To remove all sources of irritation to the brain, if this can be done without causing further serious

damage to it. One cannot undo the initial surface wound or cerebral lesion, but one can try to procure a condition which will allow healing to occur more rapidly, more normally, and with less permanent impairment of function.

4. In any case to procure rapid healing of the superficial parts, provided that the brain is safe.

We may be charged with being too zealous in operating on head injuries. I cannot remember death occurring after any operation which was not one of urgency. We have regretted that we have not operated or operated sooner on some patients who have done badly. In all injuries we claim that operation furnishes an additional and usually accurate means of diagnosing the extent of the lesion. In minor injuries it has done no harm so far as can be ascertained, and it renders the patient fit to return to duty at a much earlier period than would otherwise be the case.

We believe that it is better to send a patient home with a healed scalp and healthy skull, inside which are the fewest possible potentialities for future brain trouble, than that he should go with the prospect of a later operation on an area which is obscured by many abnormalities. If it can be shown that this is done with as great safety as attends more conservative methods, our procedure is more than justified.

Sepsis and the exigencies of war will always make the proportion of failures a relatively high one. Unless these military exigencies will permit of "head" cases being retained near the front for operation and for a fairly long after-treatment, it is not likely that mortality and loss of function will be reduced to any great extent. It is difficult to see how better arrangements can be made, or, indeed, how any important improvement can be introduced in the methods for disposal of all classes of wounded which already exist.

The Routine of Treatment.

The following description of routine treatment carried out in hospitals varies only slightly from that given in a small set of leaflets issued in April, 1915.

On admission of the patient his scalp should be shaved, the wound thoroughly examined (the use of a probe is deprecated), two skiagrams taken in planes at right angles to each other, and an exhaustive neurological examination made. If the whole scalp is not shaved, other wounds, sometimes more important than the most noticeable one, may be overlooked. An aperient should be given and the administration of urotropine (15 to 20 grains every three or four hours) begun. If the brain is injured it is well, for future guidance, to make a bacteriological examination of the discharge. If brain matter is exposed or exuding from the wound, operation should be carried out as soon as possible. In most other cases, in absence of urgent symptoms, there need be no great haste, but in no case should operation be postponed for longer than a couple of days.

Excision of Wounds.

The majority of wounds of the scalp should be excised, and the bone beneath carefully examined. If no further interference is made, the wounds can be sutured, usually without drainage. It may be necessary sometimes to slide flaps in order to make up for defects in the scalp.

Depressed Fracture.

Every case in which depressed fracture of the skull is suspected should be explored without undue delay, whether sepsis is present or not. Delay—waiting for surface wounds to clean—too frequently leads to dangerous intracranial developments. If the edge of the wound is much inflamed and infiltrated, treatment with hypertonic saline applications usually makes it fit for excision in twenty-four to forty-eight hours. In most cases it is possible so to excise the wounds in both scalp and bone that an aseptic field of operation is left. If sepsis has already penetrated to the depth of the brain, the sooner operation is done the better. It is rarely necessary to turn down large flaps.

The injury comes under one of the following varieties:

1. *Cases without Definite External Signs of Depressed Fracture.*

Because fracture with displacement of the inner table or some other subcranial lesion may be present it is important that operation should be carried out.

(*a*) When the entrance and exit wounds are separated so far by a bridge of scalp that the line joining them traverses the bone, or if the patient has been stunned at the time of injury, the presumption is that the bone has been damaged. Such wounds and the track between them, as well as single gaping wounds of the scalp, should be excised *en masse*, including the pericranium. Injury, even mere bruising, of the periosteum usually means that the bone has suffered. If focal loss of function (even although evanescent), persistent headache or giddiness, or other more definite signs of cerebral compression are present, especially if optic neuritis coexists, trephining should be done, even in the absence of definite laceration of the periosteum.

(*b*) If fracture of the outer table without depression is found, or even if the bone is merely bruised, a small trephine opening should be made and the inner table examined. Depressed fracture of the inner table may exist without any cerebral symptoms, and only the very best skiagrams will show such a fracture.

Operation in such cases is practically without danger.

2. *Fracture with Depression, but without Injury to the Dura Mater.*

The fractured and depressed bone must be removed by means of properly devised bone gouge forceps if possible, otherwise a small bone disc must be trephined at one side of the fracture before using the forceps. It is better to work with a small forceps and nibble the bone away in tiny pieces than to use a large powerful forceps, which may cause extensive fissure fracture. It is not necessary in such cases to trim the edge of the opening in the bone. It seems likely that bone is thrown out more readily from an untrimmed margin, so that the opening may become greatly reduced in size. If the dura is apparently normal and the brain pulsates well, the operation can then be completed by suture of the scalp, with or without drainage. If, however, the dura is muddy-looking; if there is loss of pulsation and circumscribed loss of elasticity, especially if focal symptoms have been present after the wound was received, the dura should be opened. This is usually best done by a small crucial incision, made by stabbing a scalpel in at right angles to the dura. Disintegrated brain and blood clot are squeezed out by the *vis a tergo*. If the pulped material does not come out quite readily, it may be helped out by inserting a small artery forceps and opening the blades so as to dilate the hole in the dura. Only the useless matter will exude unless the intracranial pressure is high, in which case lumbar puncture, or possibly even a large decompression operation, is indicated.

3. *Injury of Dura without Foreign Body or Sepsis.*

Fracture with injury to dura mater, when no foreign body is present, and the wound in the brain probably aseptic. After excision, *en masse* as before, the scalp wound may be enlarged in any desired direction. It is very rarely necessary to turn down a flap. The bone around the fracture is cleared. A "trephine" opening is rarely required. The spicules are removed and the skull cut away carefully with forceps to an extent varying with the injury to the dura. A clear margin (one-third of an inch) of uninjured dura should be exposed. Ragged edges of dura should be excised. If a "track" exists in the brain, this should be carefully explored, by the finger if possible, and any collection of pulped brain tissue allowed to escape. A piece of aponeurosis may be drawn across the opening in the dura, and the operation completed by suturing the scalp wound. A drain of folded jaconet or small rubber tubing should reach from the opening in the dura through one end of the wound. It should be removed after twenty-four hours. If sepsis asserts itself, the wound should be freely opened up at once.

4. *Injury to the Dura complicated by a Foreign Body in the Brain and by Sepsis.*

The position of the foreign body is previously localized by *x* rays. At the operation (as in para. 3), the track through the brain matter can usually be explored by the *index* finger. It may be necessary to enlarge the wound in the dura slightly. The foreign body having been located, a suitable flat or slightly curved scoop is passed along the finger under the foreign body, which is then pressed against the point of the finger, and all three are carefully

and gently withdrawn. The greatest delicacy of touch is required during this procedure. The finger, in a flexible manner, must follow the previously formed track, and must not break through uninjured brain substance. Any stiffness of the finger must be avoided. The use of a forceps is apt to increase the damage to the brain.

If the operation is done within a day or two of the reception of the wound a drain should be inserted along the track. If it is performed at a later stage and no sepsis is apparent to the eye, one need not insert a drain deeply unless considerable oozing has been caused by the extraction of the foreign body.

If definite sepsis is present drains should be inserted leading straight out through the wound. In the worst cases the scalp wound should not be sutured till all danger has passed.

The exploration for foreign bodies by the finger at the primary operation is justified by the following considerations: (1) A track through brain substance is already present; (2) only very rarely is further injury to the brain caused by the procedure; (3) the frequency with which an abscess develops, should the foreign body be left in the brain; (4) if the wounds are large, sepsis has almost certainly penetrated along with, or following, the foreign bodies, and, as has been said, the sooner they are dealt with the better.

As already indicated, foreign bodies imbedded in the brain, by their direct influence and by their interference with the cerebral circulation, may produce symptoms of focal irritation and of compression or increased intracranial tension. If their removal does not immediately relieve these, and especially if hernia cerebri is threatened, lumbar puncture should be resorted to. If this fails to relieve the intracranial tension, subtemporal decompression may give relief, but has on the whole proved an unsatisfactory operation under these septic conditions.

5. *Fracture with Injury to one of the Blood Sinuses.*

Operation in such cases may be difficult on account of the alarming haemorrhage which may occur during exposure of the sinus. It should not, therefore, be undertaken by an inexperienced operator. The size of the superficial wound of the scalp or skull gives no indication of the extent to which the sinus may be injured. The results of such operations have been very favourable. Three of the procedures recommended for control of such haemorrhage have practically been given up—namely, lateral application of suture or forceps, plugging with gauze, and ligature. Plugging and ligature especially must be avoided behind the entrance of the parietal lacunae or cerebral veins. It has been found that practically all cases which survive the immediate effects of the injury are amenable to treatment by the application, under light pressure, of a piece of aponeurosis cut from the edge of the scalp wound or from the fascia lata of the thigh. The procedure is known as the "postage stamp" operation.

After free exposure of the hole in the sinus, haemorrhage therefrom being controlled by light gauze pressure, the "stamp" should be cut and spread on the palmar surface of the point of the operator's gloved index finger or on a small swab covered with batiste or rubber tissue. The perforation is then blocked by a finger of the other hand. All blood clot is carefully wiped away, the controlling finger is removed and the "stamp" applied rapidly over the perforation. Fairly firm equable pressure is kept up for a few minutes, when the graft will have adhered to the wall of the sinus. A hole, measuring $\frac{3}{4}$ in. by $\frac{1}{2}$ in., has been closed successfully in this way, and, judging by the ease with which this was done, it should be possible to close even larger ones. The graft should always be covered by scalp at the end of the operation. In these cases it is practically always possible to suture the scalp wound completely, a small soft drain being inserted close to but not on to the graft, and withdrawn in a day or so.

Lumbar Puncture.

Lumbar puncture has frequently been found to give relief in cases of local circulatory disturbance after operation—evidenced, for example, by persistent headache, recurring focal muscular spasms, or slight hernia cerebri. The amount of cerebro-spinal fluid withdrawn varies with the pressure of the fluid. It is rarely necessary to remove more than 25 c.cm. or thereby. Usually the withdrawal of a much less quantity suffices. The process may be repeated several times if thought advisable.

Certain cases of large fungus cerebri have been cured by this procedure. If fungus is present, however, while it is to be regarded as a symptom of increased intracranial tension, it must be remembered that this is frequently due to the presence of foreign bodies or abscess in the brain or to more diffuse encephalitis or meningitis, and suitable remedies must be used for these conditions. If meningitis is present or if the fungus is fairly recent, rapid removal of cerebro-spinal fluid may allow infection to spread. The wound should always be exposed for inspection when lumbar puncture is done, because this may cause the herniated brain to sink back to a considerable depth, and protective adhesions may be torn. If lumbar puncture fails to alleviate the condition, a contralateral decompression operation may be tried.

Spirit dressing is usually employed for such cases. Picric acid ($\frac{1}{2}$ to 1 per cent.) or some astringent preparation may, with benefit, be added when discharge is free.

In most cases of hernia cerebri it will be found that posture has a marked effect, the protrusion being lessened when the patient is propped up in the "Fowler position."

It is not advisable to make lumbar puncture in the early stages after a wound of the brain has been caused, unless the dura is intact, or until the exact local conditions have been revealed by operation.

Operation.

The operation necessary in the majority of head injuries arriving at the base is a comparatively simple one. If preceded by infiltration of the scalp with local anaesthetic and adrenalin, haemorrhage and shock are obviated to a very great extent, and the operation made even more simple. The dangerous haemorrhage which may occur from large flap incisions is entirely prevented by this infiltration of the incision area with adrenalin solution, and, if some local anaesthetic has been added, the amount of general anaesthetic required is negligible.

All serious cases should be kept at the base hospitals for three weeks after operation, and even longer if one is not quite satisfied with their condition.

RESULTS.

The records of 135 cases admitted to R—— from the fighting in the end of September, 1915, and those otherwise available at the moment from three of the hospitals (257 cases) show a total of 392 cases trephined with 58 deaths—a mortality-rate of 14.8 per cent. Cases are included in this list in which the patient's condition was so bad that mere cleaning of the wound alone was possible. Whenever bone, even superficial fragments, is removed, the operation is classified as "trephining." None of the cases died in which the lacerated brain was found free from visible pus. Recovery occurred in most of the cases in which the track was definitely septic and in many in which quite extensive abscess had formed, but it was very rare in cases in which large fungus cerebri had developed.

If 12 "hopeless" cases, which died within forty-eight hours of admission, are excluded from the September, 1915, series, the mortality-rate is only 9 per cent.

REFERENCE.

[1] Treatment of Gunshot Wounds by Excision and Primary Suture, BRITISH MEDICAL JOURNAL, August 28th, 1915, p. 317.

The American National Association for the Study and Prevention of Tuberculosis reports (we learn from the *Journal of the American Medical Association*) that during 1915 more than £4,500,000 was spent in fighting tuberculosis. This is an increase of £3,500,000, as compared with the expenditure in the campaign against the disease ten years ago. From the care of tuberculous patients, which was at first its sole function, the work of the association has grown until last year more than £200,000 was spent on organization and education; an equal amount in examining, advising, and treating patients; more than £70,000 in teaching and treating tuberculous children, and nearly £150,000 in the care of tuberculous lunatics and criminals. The bulk of the money spent in the campaign was expended on sanatoriums and hospitals. These, numbering nearly 600, cost £3,850,000.

TREATMENT OF MAXILLARY FRACTURES.*

BY

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THE subject of maxillary fractures is large, but that part of it which interests military surgeons is the immediate and effective treatment of cases that come to military hospitals as a result of gunshot wounds. The number of injuries of the head and face is by no means a negligible quantity, and their efficient treatment is somewhat out of the sphere of the general surgeon. It is true that these cases are rarely fatal, yet any failure to treat them efficiently may be followed by serious deformities of the face and inefficient masticatory power, with its resultant lowering of the resistance of the patient. On the other hand, immediate treatment will give very satisfactory results and facilitate such future work as plastic operations intended to restore the functions and cosmetic appearance of the face and jaws.

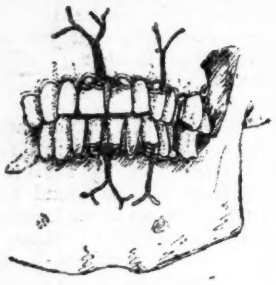

FIG. 1.

Ligation of Teeth with Brass Ligatures. — The wires are passed and twisted around the necks of different teeth, and then the upper and lower teeth fastened together. Bicuspids and molars are wired singly, but incisors and cuspids should be fastened together in pairs, as in the diagram, then attached to the corresponding teeth of the opposite jaw. This method is especially useful for simple fractures, or fractures with very little displacement, involving the mandible only. It is not applicable in cases with extensive wounds, which require more adequate drainage of the mouth than this treatment affords.

Fractures of the maxillae, especially the mandible, follow the same general lines, and their treatment is guided by the same principles as fractures of other bones, but certain local conditions have to be taken into consideration:

1. The mandible is a very mobile bone, and is supported and controlled by muscles of mastication which have very great contractile power. It is exposed and very irregular in shape. Fracture of this bone, therefore, is very often associated with considerable displacement of the parts.

2. Fractures of the jaws are almost always compound, and, as the mouth is an ideal nidus for bacterial infection and subsequent complications, much is added to the difficulty of treatment.

3. Being the most mobile and exercised bone of the body, the parts of a broken mandible are very difficult to hold together.

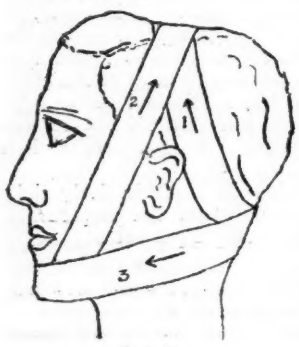

FIG. 2.

Barton Bandage.—This form of bandage affords a simple and effective method for reducing downward and forward displacement of the mandible, and holding the two jaws in close proximity. The turn passing under the chin is applied in the direction in which the force is required.

The cases of fracture of the jaw we are called upon to treat differ widely from those met with in civil practice. First, there is an external wound, varying in size from a small opening to a very extensive lacerated wound of the face or under the chin; and, secondly, the fractures are always comminuted and often multiple, involving the upper as well as the lower jaw. In more severe cases there is loss, varying in amount, of bony as well as soft tissue. Moreover, the injury is rarely confined solely to the jaws, generally involving, in addition, eyes, ears, nose or pharynx.

There can be no mistake in diagnosis, but it is necessary to ascertain the number of fragments, the directions of the fractures, the amount of lost tissue, and the location of foreign bodies as well as fragments of the bones or misplaced teeth. The *x* rays will give very valuable assistance, and a radiograph of every extensive case should be taken.

Treatment.

I will not discuss the care and treatment of the external wound, as that is not essentially different from that of a wound in other parts of the body, but confine myself to the matter of adjustment and setting of the bony parts.

Our aim must be to create a comparative immobility of the parts, and to restore the functional activity of the jaws as far as possible. It has been an accepted practice in the past, and one somewhat in use at present, to connect the parts together with wire sutures or metal plates fastened to the bones. This method, while useful in exceptional cases, has some serious objections. It quite often interferes with the normal occlusion of the teeth, creating deformities, and, as the mouth cannot be kept sterile, infection spreads, causing additional complications.

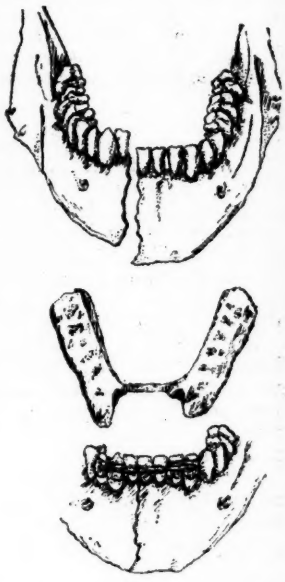

FIG. 3.

Modified Vulcanite and Band and Wire Splints.—Either of these is applicable to fractures of the mandible, and are especially useful where there is loss of teeth and contiguous tissues. The heavy wire bar of the vulcanite splint affords a bridge over the lost tissues, and removes the objection to the continuous vulcanite type by giving adequate drainage to the mouth.

The oral surgeon, however, follows a different method. All the fixation is accomplished by utilizing the remaining teeth or roots and the alveolar ridges, assisted by bandages and chin and head supports. Our knowledge of the normal occlusion of the teeth gives us an excellent guide. This should be emphasized and followed very faithfully, no matter how extensive the fracture, or how much bony tissue is lost. Otherwise we may create very serious deformities that will upset the symmetry of the facial contour and the performance by the jaws and tongue of their normal function—the efficient mastication of food and proper articulation in speech.

It has been customary in the past to ligate the upper and lower teeth together with brass wires and support the jaw with bandages, a method which, while very simple and useful in many fractures as seen in civil life, I find of very little use, as the cases are complicated by external wounds.

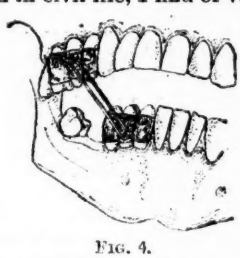

FIG. 4.

Intermaxillary Elastics.—Elastic bands drawing between hooks soldered to metal bands (which are soldered in pairs or triples to prevent elongation of the teeth in their sockets) are useful for gradual reduction of displacements of the mandible. Elastics can be applied by this method so that force may be exerted in any desired direction.

If the fractures are anterior to the last lower teeth a simple splint of vulcanite or metal is made and cemented on, fitting over the teeth, allowing always room for drainage of the wounds of the mouth. This gives the patient the chance to use the jaws moderately. The same result is accomplished by using metal bands around the teeth and connecting these with heavy wires. If the fracture is at the angle of the mandible or along the ascending ramus, the lower jaw is attached to the upper either by rubber bands, silk ligatures, or wires, splints being made accordingly.

In cases which come under treatment late the question is more complicated. The external wounds in healing form scar tissue, the displaced parts of the bones begin to

*Read at a meeting of the Military Medical Society mentioned in the BRITISH MEDICAL JOURNAL of December 18th, 1915, p. 905, and December 25th, p. 938.

form union, the muscles of mastication lose their contractile power, partly owing to want of use and partly through injury, and ankylosis of temporo-maxillary joints is very marked. In addition we have gross deformity of the face. In these circumstances the correction must be gradual. We have to fight against the cicatricial tissues, and that is always difficult. Mechanical appliances must necessarily be more or less complicated, and the degree of success is partly proportional to the ingenuity of the oral surgeon, as new appliances have to be devised to meet the demands.

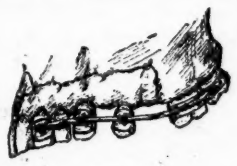

FIG. 5.

Metal Band and Wire Splint for Maxilla.—A useful retaining appliance for fractures of the upper jaw, which has been used successfully in fractures involving the process carrying all the teeth of the maxilla, except the two last molars on one side.

Cases with extensive loss of soft and bony tissues are comparatively difficult to treat, and it is impossible to outline a class of appliances to meet them, as each has its own peculiarity and should be handled accordingly. We have, however, certain rules to guide us:

1. We must try to control the infected area by free drainage and frequent irrigations, etc.

2. No attempt should be made to suture the soft parts with the idea of closing the gap until such time as permanent splints are adjusted and union of the bony fragments is well under way. This rule is practically universal with all the oral surgeons doing extensive work of this kind.

3. The appliance should be made with the intention of holding the dissociated parts in their normal positions, taking as a guide the normal occlusion of the teeth.

Fractures of the superior maxilla are easier to control than those of the mandible, as they are more or less firmly connected with the other cranial bones. If there is no displacement, simple bandaging is usually sufficient. More complicated cases are treated with splints made of either rubber or metal, assisted by straps passing over the top of the head.

FIG. 6.

A form of band and wire splint, useful in the reduction of multiple fractures of the mandible, where a one-piece splint is not practicable. It affords a method for the gradual reduction of extensive displacement of the broken parts, not found in continuous wire splints. (From casts.)

Care of the Mouth.—The care of the mouth is a very important part of the treatment. It is very foul, owing to the inability of the patient to clean it properly. The wound, always opening into the mouth, gives a constant source of new infection, so that precautions should be taken by frequent packing, etc., to prevent the flow of saliva into the wound.

The following methods I have found very satisfactory:

1. Tincture of iodine is applied to the gums and teeth with a small piece of cotton.
2. Pledgets of cotton are saturated with hydrogen peroxide and rubbed over the teeth and all the mucous surfaces of the mouth as thoroughly as possible; this helps to remove particles of food, mucus, clots of blood, etc.
3. The mouth is irrigated with an antiseptic fluid.

The nurse should be instructed to repeat this treatment three or four times a day, except the use of iodine, which is applied only two or three times a week.

Complications.—Fractures of the maxillary bones alone are rarely fatal, but gunshot wounds are seldom limited to the jaws. The bullet may pass through or lodge itself in the head or neck, causing serious damage to the organs and tissues of the immediate neighbourhood. We must not overlook this fact, and the patient should be watched very carefully in the first few days. It is highly important to examine the path of the bullet, and determine the amount of injury done as far as is possible.

The complication most dreaded is sudden haemorrhage. This is most common, of course, when the injury is in the immediate vicinity of good-sized blood vessels, particularly those of the neck. A very slight flow of blood, either from the external wounds or the mouth, should be carefully followed up. It may be the beginning of a serious haemorrhage.

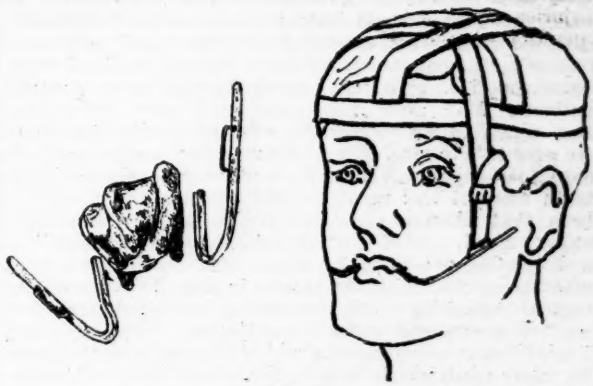

FIG. 7.

Kingsley Bars.—This appliance consists of a vulcanite plate holding at the sides square metal tubes, for the reception of squared heavy wires, which extend externally from the corners of the mouth along the cheeks. The splint is supported by a head harness connected to the bars. This splint gives an excellent anchorage from which to work to the mandible, in cases in which fractures extend to both jaws.

An extensive fracture of the superior maxilla may involve the cranial bones and lead to disorders of the higher nerve centres, a possibility which should be carefully considered.

Among the minor complications we may expect is ankylosis. In very many cases this is only temporary, due to the injury of the soft tissues and the non-use of the jaws. Yet if the injury is at the temporo-maxillary joint we may have serious results if the treatment is not in the right direction. To prevent adhesions the mobility of the joints should be encouraged.

The control of the inflammation, abscesses, and necrosis of the tissues is part of our general treatment.

Importance of Early Treatment.—The importance of early treatment of maxillary fractures cannot be overestimated. The appliances should be adjusted as soon as possible, as this assures the quickest and best result. I have noticed that on account of the unsightly appearance of the external wound there is a strong temptation to give attention to the wound, to the neglect of the setting of the bones. The wound should undoubtedly receive proper care, but the fundamental treatment must begin with the bony structure. If the patient has a fractured arm we do not wait several weeks or months before applying our splints or bandages. This rule holds equally true with fractured jaws.

War-time injuries to the jaws, with their attendant injuries to other parts and resulting constitutional disturbances, are best handled by the hearty co-operation of the general surgeon and the oral specialist, working together for the welfare of the patient by restoring to him as far as possible his normal facial appearance and the use of his jaws and teeth in the processes of mastication.

I desire to express my great indebtedness to my friend and colleague, Dr. F. H. Brigham, of the Harvard Surgical Unit, for the skill and care with which he has prepared the diagrams that illustrate this paper.

Brigade-Surgeon Lieutenant-Colonel Andrew Barry, I.M.S., of St. Andrews, Fife, left personal estate valued at £23,066.

THE report of the Surgeon-General of the United States Navy for the fiscal year 1915 shows that the death-rate was only 4.18 per 1,000 per annum. Three years ago there were 222 cases of typhoid fever with 15 deaths; the present report shows 13 cases with no death. This improvement is said to be due almost entirely to prophylactic inoculation. The rate for venereal diseases was higher than that for 1913, but lower than those for 1909–12. The rates for tuberculosis showed improvemen

DENTAL CASES AMONGST SOLDIERS.*

BY

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OF those men who have received dental treatment at this hospital 16 per cent. were suffering from gastritis or other digestive disturbances, and nearly every one of these had been sent back from the front for this cause alone. In every instance a rapid improvement was shown after the diseased roots were extracted and the mouth and teeth cleaned, although in many instances no artificial teeth were supplied. We have never had so many grateful patients. Man after man came back to us and told us how much better he felt after even the limited treatment we were able to give. Where the man was in other respects capable of going back to the front we have supplied artificial teeth when it was necessary and possible. Our rule has been that when a man had two upper and two lower molars which occluded fairly well, and also useful incisors and cuspids, not to make plates We are forced to omit many cases that might be greatly improved; but we have treated the aching tooth, and treated and filled many that we felt sure would suffer if not treated. We have noted a condition in many mouths which we rarely see at home. In many teeth which have enormous cavities the dentine has hardened and the pulp receded far beyond its normal position. These we refrain from touching when there is no history of pain and no sign of abscess formation, because the time of the average patient in these hospitals is not sufficient properly to treat and remove the pulp and fill the root canals; the patients' chances are seemingly better if we soak the hardened dentine in a saturated solution of silver nitrate and omit further treatment. A few cases of pyorrhoea alveolaris have come to us in which the mouth was so sore that the patient could not chew. These patients were sent to the hospital for no other reason, and to our great surprise yielded quickly to treatment. In more refined circles this so-called Riggs's disease is a much more difficult disease to cure, and differs in many respects from the cases we have seen in the army. All of the cases among the soldiers are characterized by enormous deposits of tartar around the necks of the teeth, which deposits, however, do not seem to push their way down upon the peridental membrane surrounding the roots, so that there are few deep incurable pus pockets, and the characteristic odour of advanced Riggs's disease is rarely present. There is usually pus at the gum margins; but with the removal of these great concretions, and very few treatments with iodine, the mouth clears up wonderfully.

I have come to the conclusion that the cleansing of the teeth of most hospital patients would be a most profitable undertaking, for invariably the patient comes back in a day or two and tells us how much better his appetite is, and how much better his food tastes. Nearly all of these patients have great tartar deposits, usually quite easy to remove, and nearly all are swallowing with each meal an appreciable amount of pus. The youngest graduate, or even well-trained three-year students, could do this work under a competent superior, and I am sure it would be a great economy. Many of the nurses could be trained to do much of this work. In some of the States at home we are beginning to employ dental nurses for just such treatment. Of course it would be better still if the men could be started with a reasonably sound and clean set of teeth; but I realize that we are dealing with a great emergency, which must be met in the most efficient and at the same time most economical way.

Some of the cases of rheumatism are undoubtedly due to mouth conditions, while the progress of other cases toward improvement must be retarded by the absorption of these mouth toxins. At the present time at home, if a physician has a rheumatic patient, that patient is immediately sent to a dentist for an examination of his mouth, and, if necessary, *x* rays are used to discover if there are any pus pockets at the ends of the roots of teeth. Perhaps the pendulum is just now swinging too far in the direction of the teeth as causal factors in this and other diseases; but it has been proven beyond doubt that blind abscesses and other diseased mouth conditions are responsible for a very large number of cases, and the removal of these foci of infection marks the beginning of the cure.

The same is true of some of the heart and kidney irregularities; but because of the brief stay of the patients at these neighbouring hospitals it is not possible in many cases to see the bearing of the mouth conditions upon these diseases. Here, too, repair work and mouth cleansing could be practised with great profit.

Another point which is of great economic value is the lowering of a man's resistance to disease because of the absorption of mouth toxins, and the derangement of his digestion because of his inability to chew. The unclean mouth harbours the germs of many diseases. The pneumococcus is present, so far as I know, in all mouths where Riggs's disease is present, and in many apparently healthy mouths also. The staphylococcus, streptococcus, streptothrix, and several forms of amoeba are found there in great numbers. In fact, the uncared-for human mouth is the prize bacterial garden of the world, and mouth-to-mouth infections are more common than we dare believe. Therefore—I say it with all seriousness—a supply of toothbrushes, and perhaps fine pumice, and a toothbrush drill at every training station, would be a most profitable investment of time and money. A number of us in the United States have started a dental hygiene movement; and because we know how impossible it is to teach an old dog tricks, we are confining ourselves to work on the children.

It is interesting to know the cost to a country of poor teeth, and these figures may give a rough idea. In the State of New York it costs 36 dols. a year for each child in the public schools; 40 per cent. of absences from school are caused by toothache; 67,000 children fail each year to pass their examinations, and cost the State an additional 36 dols. for an extra year's work; 40 per cent. of these fail because of wretched mouth conditions. A little simple arithmetic will show that the diseased teeth of her school children cost the State of New York nearly a million dollars a year; and I ask, simply as an economic problem, Does the care of the teeth pay?

*Read at a meeting of the Military Medical Society mentioned in the BRITISH MEDICAL JOURNAL of December 18th, 1915, p. 905, and December 25th, p. 938.

DEFORMITIES OF THE JAWS RESULTING FROM OPERATION OR INJURY.

BY

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ANALOGOUS types of deformity are occasioned whether the injury be accidental or, as in operations, deliberately planned. As, however, in the case of operation, the question of expediency and other modifying factors must necessarily be raised, it will be convenient to consider separately the deformities produced thereby. The method of treatment, however, depends on the type of deformity irrespective of the cause producing it. A survey of these deformities will give opportunity for the enunciation of certain fundamental principles of treatment and for the demonstration of methods adapted to giving them effect.

Traumatic deformities of the jaws fall naturally into two groups, according as they are, or are not, associated with loss of substance. Loss of substance may be the sole deformity, or be complicated by displacement of the remaining part or parts. In cases in which it is necessary only to replace a mass removed or lost, the problem is one of purely mechanical prosthesis. It is not our purpose to discuss at any length the technicalities of dental prosthesis, but rather to deal with those cases in which preliminary treatment is essential for success, or in which other than prosthetic apparatus is necessary.

DEFORMITIES RESULTING FROM OPERATIONS.

I. *Operations on the Upper Jaw: Resection of the Maxilla.*

The deformity thus produced is typical of that resulting from loss of substance without displacement of the parts remaining. A satisfactory functional result can be obtained by the adaptation of a suitably constructed obturator, the objects to be attained thereby being threefold:

1. To separate the nasal from the oral cavity.
2. To restore the masticating surface.
3. To restore the facial contour.

Particularly in cases where the operator has been unable to preserve the orbital plate it will be found that the apparatus must of necessity be bulky. The usual method of securing the lightness essential for retention and comfort is to render hollow that portion of

FIG. 1.

FIG. 2.

the obturator which fills the gap on the affected side, and the material commonly used is vulcanite. We suggest an aluminium box, which can be cast separately, or a plate and box cast in one piece, together with the tags which serve to retain the vulcanite with which the teeth are afterwards attached. The apertures necessarily left are tapped and securely closed by aluminium pins with a corresponding thread.

The construction of the appliance, whether made of vulcanite or aluminium, presents no particular difficulties, but certain practical details deserve mention. It is sometimes stated that no attempt should be made to distend the cheek. This is certainly not the case. The cheek can be considerably built out. The cosmetic result is more perfect, no harm is done, and after the first few days no discomfort is felt.

The date of insertion is an important point. As a rule, it should be from three weeks to a month after operation. Broadly speaking, the more removed at operation the sooner should the obturator be fitted. More particularly is this the case where removal encroaches on the pterygoid region. This was well exemplified in a case operated on by Mr. Joseph Cunning. The patient was a boy from whom Mr. Cunning removed the maxilla for a naso-pharyngeal angeio-fibroma which had filled the antrum and nasal fossa, had found its way into the orbit, and encroached on the temporal and zygomatic fossae. Within a month a firm cicatrix had formed which prevented efficient opening of the jaws. It was found necessary to divide the cicatrix under an anaesthetic to enable a reliable model to be taken. The appearances before and after operation are illustrated in Figs. 1 and 2. The cheek was considerably distended; mastication and speech were perfectly restored. Wherever possible, the soft palate should be retained intact. If, as in another case operated on recently by one of us (P. P. C.), it is necessary to remove one half of the soft palate, the remaining half should be drawn across and fixed to the raw pharyngeal wall.

II. *Operations Involving the Lower Jaw.*

The operations to be considered under this heading include those undertaken to give readier access to growths of the tongue, floor of the mouth or tonsillar region, and those undertaken for growths invading or involving the jaw itself. In the former case the mandible will be merely divided; in the latter case the operation will include the resection of a portion or one half of the mandible. The objects to be attained are the thorough removal of the growth, and if possible a satisfactory functional result. Generally speaking, the functional results after resection are far from good. This is due, we think, in many cases to the fact that the surgeon does not fully appreciate how valuable is the assistance that can be rendered him by the prosthetic dentist, and in other instances to the lack of that personal collaboration between surgeon and dentist which is essential for success.

It is freely admitted that no considerations as to function should militate against the thoroughness of an operation once undertaken, but no operation on the jaws should be performed until the question of function has been fully considered and a definite plan formulated for its preservation. The surgeon tabulates freedom from recurrence as a surgical success. The patient's gauge of success is his ability to enjoy life. The surgeon preens himself on his achievement; the patient may wish himself dead. The functional problems associated with operations and injuries of the mandible are essentially different from those concerned in corresponding lesions of the upper jaw. The fundamental principle, if mastication is to be efficiently preserved, is the maintenance of the mandible whole, part or parts, in its, or their, normal relationship to the maxillae. In other words, the normal "bite" must be accurately maintained.

(*a*) *Simple Division of the Jaw.*

The intrabuccal route for removal of the tongue, in many cases of cancer of that organ, is open to criticism on the ground of insufficient exposure. In growths involving the floor of the mouth and the deep postero-lateral regions of the tongue it is admittedly inadequate. Splitting of the jaw in or about the middle line is a valuable aid to free access in such cases, and were it not that in the most favourable circumstances convalescence is considerably retarded, it would, we think, be more frequently employed.

The lower jaw has notoriously a poor blood supply, and the insertion of wire to coapt the fragments, in what is necessarily a compound fracture constantly exposed to septic infection, leads to delayed and often imperfect union, and in many cases to necrosis. Apposition can be firmly and accurately maintained by means of an interdental splint. The essential factor is the presence of two or three moderately firm teeth on each side of the division site. It may be urged that the necessary teeth may not be present; that, if they are, the better prognosis in edentulous cases should determine their removal; and that the apparently flimsy interdental splint must soon become loosened and so fail in its purpose.

Fortunately the lower front teeth are usually the last to be lost and will, in the majority of cases, be found standing in patients already otherwise edentulous. Fortunately, too, their configuration and position render them peculiarly amenable to conservative methods, scaling, etc., and their preservation, if suitably treated for a week or ten days cannot conceivably add to the risk of the operation. That the splint is adequate to maintain apposition till union has occurred has been amply proved in two cases operated on at the beginning of the year (1915) by one of us (P. P. C.). In one case the growth involved the fore part of the floor of the mouth. A laryngotomy was performed, and the contents of the submaxillary triangle, together with the growth and half the tongue, were removed in one piece, aided by median division of the mandible. Some secondary haemorrhage occurred in the mouth on the tenth day and a lateral fistula persisted for three weeks, but rapidly healed after two applications of *x* rays. Fig. 3 shows the splint *in situ* in this case. In another case—that of a soldier invalided home from France—the epithelioma involved the lateral margin of the tongue far back. A complete dissection of the anterior triangle, with the removal of the sterno-mastoid and jugular vein, was carried out. Ten days later laryngotomy

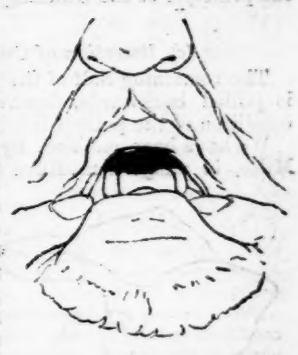

FIG. 3.

was performed, the jaw divided, and half the tongue removed.

In both cases interdental splints were fixed on the operating table, and the progress of the patients was precisely such as occurs after an intrabuccal operation. Both patients were fitted with artificial dentures, and were able to eat as well as though the jaw had not been touched.

Even moderately firm union cannot be expected in less than six weeks, and union will occur more quickly if a very fine saw be used to effect the division. This is due to the fact that the splint is fitted to the jaw before division, and, when fixed after operation, the fragments will be found separated by an interval exactly corresponding to the thickness of the saw used. It is necessary to obtain an absolutely dead fit, and to this end the splints were cast in aluminium. They were fixed to the teeth with a rapidly setting copper phosphate cement. No cement can be relied on to retain in position for such a length of time a badly-fitting splint presenting such a small surface and, for this reason, we emphasize the importance of casting in the preparation of this and other interdental splints.

(*b*) *Resection of a Portion of the Mandible.*

Invasion of the jaw is of grave significance, occurring, as it usually does, when the disease is far advanced. Many of these cases will be regarded as inoperable, both from the point of view of immediate risk and of ultimate prognosis. Resection certainly renders an operation more formidable and attended by greater risk, but from the nature of these cases great risks may justifiably be taken. In addition to the risk may be added the fear of the bad functional results obtained in these cases, and this latter consideration may be the deciding factor in deterring the surgeon from attempting a radical operation. The functional problem is here complicated by the loss of substance necessarily entailed. Difficulty arises only where removal implicates the whole thickness of the jaw, and these cases alone will be discussed. It is obvious that bony union cannot take place if the normal "bite" is to be maintained. It is, in other words, a question of union *versus* occlusion. It may be definitely stated that, in all cases attended by loss of substance, union must be unhesitatingly abandoned in favour of the preservation of the normal "bite." The attainment of this object is much more difficult if the patient be edentulous, and it is particularly in this class of case that treatment is rendered more easy by a discriminating conservatism as regards the teeth. If the requisite teeth be present, an interdental splint can be adjusted, or a modified and reinforced Angle's appliance can be adapted to both upper and lower jaws. The bite in the latter case is controlled by lateral guiding shoes in the manner described by Aehner. In edentulous cases the principle of the Gunning splint must be adopted.

(*c*) *Resection of One-half the Mandible.*

The remaining half of the jaw, if subject to no control, is pulled backwards, downwards, and inwards, and the condition of the patient is truly pitiable.

We have been enabled, by the courtesy of Mr. W. E. Miles, to adapt a modified Gunning's splint to two such

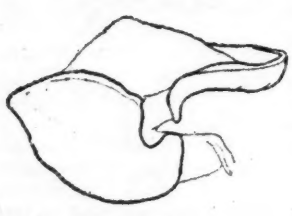

FIG. 4.

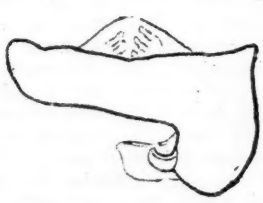

FIG. 5.

cases under his care (Figs. 4 and 5). It will be noted that no attempt has been made to deal immediately with the gap left on the affected side, the sole object of the apparatus being to retain the sound side of the mandible in its proper relation to the upper jaw. It may be objected that the presence of such a splint militates against proper cleansing of the mouth; that it will not be tolerated by the patient; and that the lower jaw will fall away from the splint and be insufficiently controlled. These objections were not sustained in practice.

Readier access was obtained to the operation site, which, as a glance at the splints will show, was left entirely uncovered. The ward sister was emphatic that the mouth was more easily kept clean with the splint than without it; the patient pleaded to have it replaced when it was removed as a test; and the light pressure of the bandages keeping the dressings in place was found amply sufficient to secure a snug contact of the lower jaw with the splint.

In both these cases the patients were almost edentulous. Should the necessary teeth be present, the modified Angle's apparatus, mentioned previously, could be utilized, but would probably not be so comfortable, at any rate in the early stages.

DEFORMITIES RESULTING FROM INJURIES.

These injuries have assumed considerable importance owing to their relative frequency during the period of the war, and to the functional disability that is apt to follow. This applies more particularly to injuries of the lower jaw, for, owing to its passivity in mastication and its fixity, functional incapacity, in injuries of the upper jaw, ensues far more rarely and can be readily remedied. The slightest inaccuracy in fractures of the lower jaw leads to a diminution in the efficiency of the masticatory power, and greater degrees of deformity result in more or less complete loss thereof.

In the case of a limb, shortening and deformity are not incompatible with the preservation of good function. In the case of the mandible, absolute accuracy of alignment is essential, and unless it is obtained smaller or greater loss of function must inevitably result. Such accuracy can only be obtained in the limbs by direct inspection and mechanical fixation of the fragments by plate or wire. In the case of the mandible, such a procedure as wiring is most emphatically to be condemned. Fortunately, the required accuracy can be obtained by other means. If each fragment can be adjusted and retained in its normal relationship to a fixed point—the upper jaw—it necessarily follows that the fragments are accurately adjusted as regards each other. Every fracture of the mandible should be treated in terms of the upper jaw. Special apparatus is necessary for each case, and, in view of the issues at stake, these cases should be immediately transferred to an institution where such apparatus can be made and where its application is understood.

(*a*) *Fractures of the Mandible without Loss of Substance.*

The fact that these patients usually possess an adequate number of teeth renders the task of treatment relatively easy. The treatment of a fractured mandible is not begun and ended with the application of a four-tailed bandage, nor should the policy of "good enough" be tolerated. There is no margin here for error, and no treatment is adequate which permits of its occurrence. The Hammond wire splint is easily made, but its use cannot be recommended where a choice can be exercised. To be efficient several firm teeth must be present on each side of the fracture, and in these circumstances the cast interdental splint is infinitely preferable and has a wider range of application. The drawings (Figs. 6 and 7), made from *x*-ray photographs, illustrate a fracture before treatment and the interdental splint in position. The patient is a soldier at present under our care. Only two shallow molars are present on the smaller fragment, and the displacement was considerable. Reduction could not be effected without an anaesthetic, and here again we feel certain

FIG. 6.

that the accurate fit of the splint is the factor responsible for the maintenance of firm retention. The patient suffers little or no inconvenience, and is able to eat minced meat.

FIG. 7.

It will be noted, perhaps, that the bite has been raised. This has no bearing on the ultimate result, and could have been obviated by the use of Snow's face bow. Sketches of the splint used in this case are shown in Figs. 8 and 9.

The Gunning splint, or the modification of it known as Payne's cradle splint, is certainly efficient, but as it is necessary to abolish all movement at the temporo-mandibular joint, its retention is necessarily attended by some degree of discomfort. Its use should be reserved for those cases not suitable for an interdental splint. The scope of the interdental splint can, we think, be considerably enlarged, and we are at present experimenting with some modifications to that end.

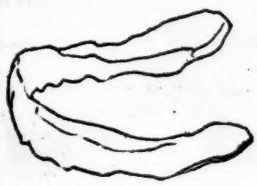

FIG. 8.

FIG. 9.

Rectification of slight degrees of mal-occlusion can be corrected by long and tedious orthodontic treatment, but such treatment is open to serious objections, and at best is a sorry means of dealing with what might easily have been prevented.

(b) Fractures with Loss of Substance.

Fractures with loss of substance are usually compound both outside and inside the mouth. The loss of bone may be immediate or result from consequent necrosis, which, in the case of the lower jaw, readily occurs. It is absolutely essential that these cases should be efficiently treated *from the beginning*. The main fragments must be retained in their correct position in relation to the upper jaw. Here, as in the case of partial resection, all considerations as to union must be abandoned in favour of the maintenance of this correct alignment. Teeth should be preserved wherever possible, for their presence renders more easy immediate and ultimate treatment. The most suitable apparatus will vary with, and be determined by, the needs of each case, and considerable scope for ingenuity is afforded. The methods finally to be adopted for the restoration of function will depend on the size and position of the gap, and on the number and disposition of the teeth remaining. These methods will be prosthetic alone or prosthetic and surgical combined. The purely surgical measures will consist of plastic operations for the reconstruction of the damaged soft parts and the introduction of bone grafts, to restore, where necessary, bony continuity in the basal portion of the jaw. It must be remembered, however, that owing to the configuration and articulation of the mandible, a lower denture can exercise, if teeth be present and favourably placed, the functions of an efficient splint and restore to the lower jaws that rigidity which has been necessarily lost or impaired. It will be found that in many of these cases a suitably adapted and strengthened lower denture will suffice to restore mastication completely.

Deformities that have been allowed to become established owing to tardy or inappropriate treatment have a cosmetic and functional aspect. The one is usually co-extensive with the other. Their prevention should be a matter for earnest effort, as is their rectification a matter for urgent demand from the suffering patient. Ingenious and complicated apparatus has been devised for the rectification of these deformities. If, however, the deformity is not established, the necessity for such devices does not arise, and if deformity is established their ability to correct it must be considered as doubtful. Certain it is that in bad cases established deformity can only be rectified by surgical intervention. A case in point is now under our care. The patient had, since his wound six months ago, been under treatment both surgical and dental. Fragments of necrosed bone had been removed from time to time, and his jaw had gradually settled back on the affected side till his front teeth were biting far back into his hard palate. All but two teeth in the lower jaw had been extracted and a lower denture fitted in an endeavour to provide some kind of occlusion. His chin had receded almost to the level of the hyoid bone.

Skiagrams showed the lesion, situated in the right molar region, to be associated with considerable comminution. Consideration of his models and adjustment of them to the correct "bite" indicated that the jaw would have to be pulled forward to such an extent as to leave a gap of one to one and a half inches at the fracture site. Success seemed very doubtful, but his request was so urgent that we decided to make the attempt. Laryngotomy was performed, and by turning back a large flap extending well into the neck the site of the lesion was exposed. It was found that union, partly fibrous and partly bony, had occurred, necessitating the use of the chisel to break it down. Firm cicatricial bands were divided on the lingual aspect, and the main body of the jaw was eventually freed sufficiently to allow it to be brought forward to the desired extent. A previously prepared cast aluminium splint on the Gunning principle was immediately adjusted, a drainage tube inserted, and the wound sewn up. The patient's facial contour is completely restored, and a good functional result is confidently anticipated.

(c) Fractures followed by Trismus.

Fractures liable to this complication are those which occur in the region of the condyle. There may be no mal-occlusion, but the loss of function is more or less serious in proportion to the degree of trismus present. The knowledge that such complication may ensue will lead to the treatment of such fractures in the "open bite" position, thus obviating the crippling results of cicatricial contraction or callus formation.

ACCORDING to the *Journal of the American Medical Association*, a bill now before Congress proposes to appoint the surgeons-general of the army, navy, and public health service a board to select a site for a national leprosarium for the United States. The sum of £100,000 is provided for building and maintenance. The leprosarium is to be administered by the Surgeon-General of the Public Health Service, who will be authorized to admit any leper who presents himself or who may be apprehended or detained under the United States quarantine laws.

IN a paper communicated by Sir Oliver Lodge, F.R.S., to the Royal Society on January 27th, Mr. F. Tinker related the results of a study of the microscopic structure of semi-permeable membranes and discussed the part played by surface forces in osmosis. Photomicrographs of the common precipitation membranes showed that they were composed of small precipitate particles packed closely together, and ranging from 0.1 μ to 1.0 μ in diameter. Each of these precipitate particles was itself an aggregate formed by the flocculation of smaller ultra-microscopic particles. Of the membranes examined copper ferrocyanide and Prussian blue had the smallest particles. The pores in a copper ferrocyanide membrane ranged from 8 to 60 $\mu\mu$ in diameter. Their size was such that they block colloidal molecules mechanically, but not the ordinary crystalloidal molecules, even when highly hydrated. A very close connexion was found between the osmotic properties of a membrane and the extent to which the membrane capillaries were under the control of surface forces. It was thought probable that osmotic effects were the result of adsorption phenomena occurring at the surface of the membrane and in the capillaries, the membrane being relatively impermeable to solutes negatively adsorbed, but permeable to solutes positively adsorbed.

Hunterian Lecture

ON

ULCERS NEW AND OLD: JEJUNAL FOR DUODENAL ULCERS.

DELIVERED AT THE ROYAL COLLEGE OF SURGEONS, FEBRUARY 4TH, 1916.

BY SIR JOHN BLAND-SUTTON, F.R.C.S., LL.D.,

SURGEON TO THE MIDDLESEX HOSPITAL.

ABOUT fifty years ago the chronic duodenal ulcer was recognized as a clinical entity, and its treatment remained for many years in the province of the physician. Operations were performed for the relief of duodenal ulceration by Codivilla (1893), Dean (1894), and Dunn (1895). In the first decade of the present century W. J. Mayo, Mayo Robson, Moynihan, Paterson, and Sherren, and others opened up a new field of surgical enterprise. We know that chronic ulcer of the duodenum is a common lesion; for some undiscovered reason, the ulcer, in the majority of instances, is situated within 2 cm. of the pylorus, and, as a rule, on the anterior wall of the duodenum, midway between its upper and lower borders. A chronic ulcer in this position is rarely accompanied by physical signs, but it sets up symptoms so easily recognized that there is no reason for resorting to the ways of Zadig in order to read them.

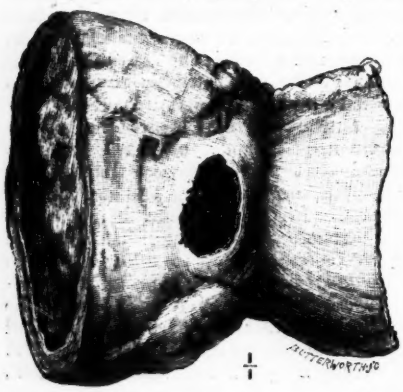

FIG. 1.—Dice-box shaped segment of the parts adjacent to the pylorus. The duodenal bulb contains a chronic ulcer. The parts were excised from a spinster, aged 55, who had been a dyspeptic for thirty years.

The duodenal ulcer often appears as a rounded depression in the mucous membrane with the muscular coat as its floor. In many, a layer of thickened peritoneum forms the base of the ulcer.

Occasionally it rests on the pancreas, the liver, or the gall bladder. An ulcer on the anterior wall of the duodenum may rest on the peritoneum covering the anterior abdominal wall (Fig. 1). A serpiginous ulcer may persist for years, creeping round the duodenum, scarring at one edge and deeply eroding at the other; the tissues forming its base are often diaphanous. The peritoneal surface of the duodenal bulb in such a case is often white with scars (Fig. 2). The obstruction of the pylorus that frequently complicates ulcers is often due to oedema of the mucosa.

This condition also occurs with ulcers situated in the pyloric antrum (Figs. 3 and 4).

Some of the most troublesome ulcers in the pyloric region can neither be seen nor felt in the course of a gastro-jejunostomy. A small duodenal ulcer can only be located with certainty when it involves the peritoneum and produces a tell-tale scar. These small ulcers cause paroxysmal pain and digestive discomfort, the symptoms of "a vext duodenum and an agitated pylorus"; this neat epigram (unearthed by Moynihan) was framed nearly a hundred years ago by Sydney Smith, the brilliant writer and preacher, who studied medicine in Edinburgh, and later in life doctored his parishioners as a rural amusement.

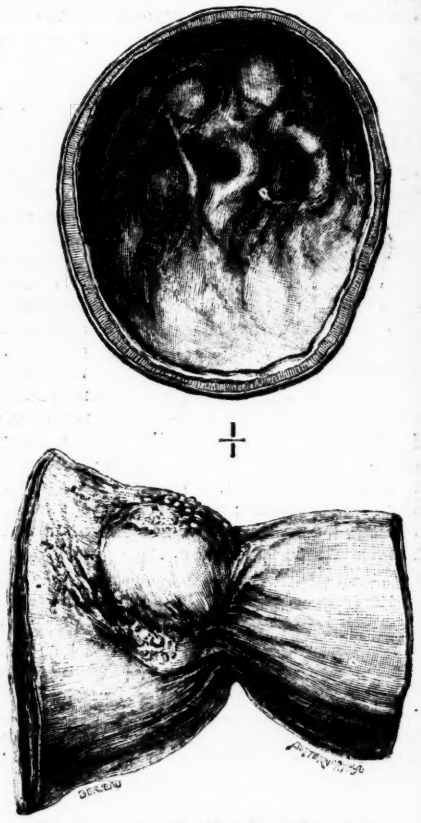

FIG. 2.—A gastro-duodenal cylinder. There is a white scar on the anterior surface of the duodenal bulb. The interior of the bulb is shown in the upper figure; it contains an active ulcer; the transparent patches indicate the scars of old ulceration. Excised from a woman, aged 45.

The chronic ulcer of the duodenum is exceptional in another feature. In all regions of the body open to observation a chronic ulcer is liable to become cancerous, especially between the thirtieth and the fiftieth years of life; this is the age incidence of duodenal ulcer. We know that chronic ulcers of the leg, lupus-scars, and gastric ulcers occasionally become cancerous, but this change in duodenal ulcers has never been proved, although they are some of the most chronic occurring in man. I have long sought among the living, the dead, and in museums for a duodenal ulcer that has become cancerous; so far my search has been unavailing. Cancer arises in the duodenum, but not in the region that is the usual seat of ulceration. The frequency with which gastric ulcers become cancerous and the infrequency of cancerous change in duodenal ulcers are difficult of explanation. When cancer exists in the stomach, small fragments, detached by the churning movements, are transported with the chyme into the small intestine, but an implantation cancer in the intestine above the ileo-caecal valve is unknown. Shattock suggests that shed fragments of gastric cancer would not escape tryptic digestion. I agree with him.

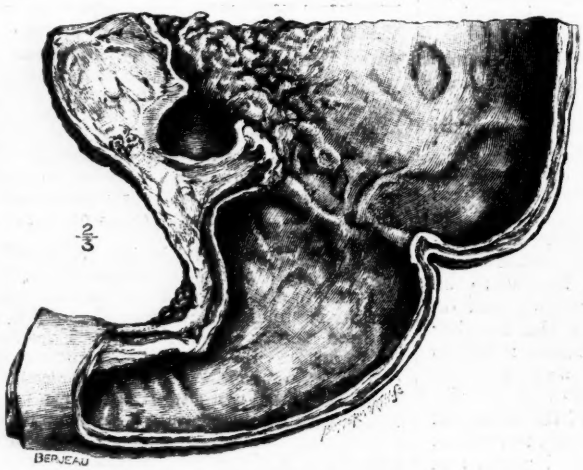

FIG. 3.—Pyloric segment of the stomach with a callous ulcer. Excised from a dyspeptic actor, aged 48.

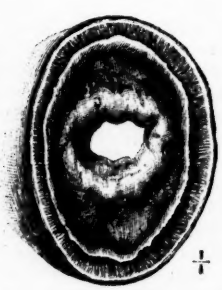

FIG. 4.—Pyloric orifice of the preceding specimen from the duodenal aspect; it shows oedema of the mucosa.

JEJUNAL ULCER (PEPTIC ULCER).

The jejunal ulcer that follows gastro-jejunostomy is often called a peptic ulcer, a term implying faith in the

opinion that it is produced by the action of gastric juice. This ulcer, described by Braun in 1899, resembles the common ulcers of the stomach and duodenum and has sharp edges, often so sharp as to look as if it has been

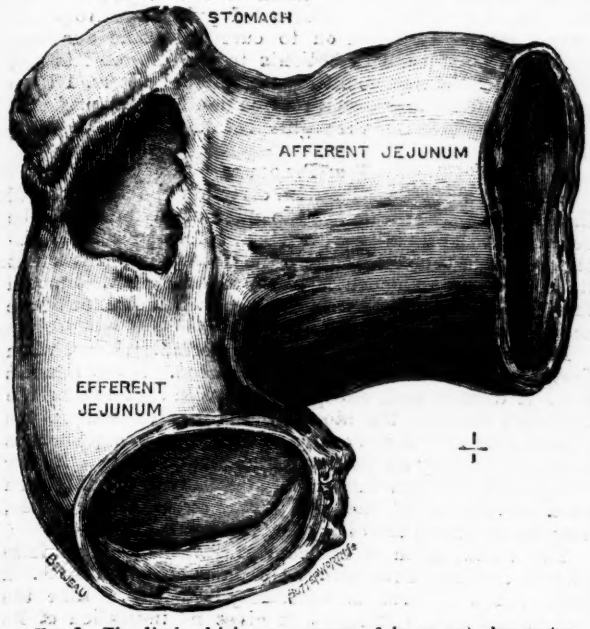

FIG. 5.—The limb of jejunum concerned in an anterior gastro-jejunostomy. A peptic ulcer is seen in the efferent limb.

punched out. It is a dangerous ulcer, and occasionally perforates before protective adhesions have formed, and causes septic peritonitis that often has a fatal ending. Some peptic ulcers have thickened edges and run a chronic course.

A peptic (jejunal) ulcer causes pain in the epigastrium, aggravated by the ingestion of food; the symptoms often resemble so closely those associated with a duodenal ulcer as to lead patients to complain that the pain and discomfort, for which gastro-jejunostomy was performed, have returned. When a jejunal ulcer follows anterior gastro-jejunostomy there is often an area of tenderness, and sometimes a definite swelling, under the upper part of the left rectus muscle. This indicates that the ulcer involves the peritoneum on the anterior abdominal wall. I have had two opportunities of studying the changes in the jejunum that precede the formation of a jejunal ulcer, and I am able to exhibit one of the specimens.

In March, 1906, I performed anterior gastro-jejunostomy on a man, aged 44, for symptoms indicating the existence of a chronic duodenal ulcer. The operation relieved the man of his pain, and he remained in good health for nearly seven years; then the pain returned with great severity, and on the urgent representation of his medical attendant the patient was readmitted, December, 1914, into the Middlesex Hospital. He complained of pain following the ingestion of food, and there was a tender area and slight swelling under the upper part of the left rectus muscle near the costal margin. I had no doubt that the man had an ulcer in the immediate vicinity of the new stoma. With the help of x rays and an opaque meal, the material could be seen escaping, partly through the pylorus and partly through the new stoma. On opening the abdomen, the white scar of the original ulcer in the duodenum was visible; the area of the stomach involved in the gastro-jejunal junction adhered to the anterior abdominal wall,

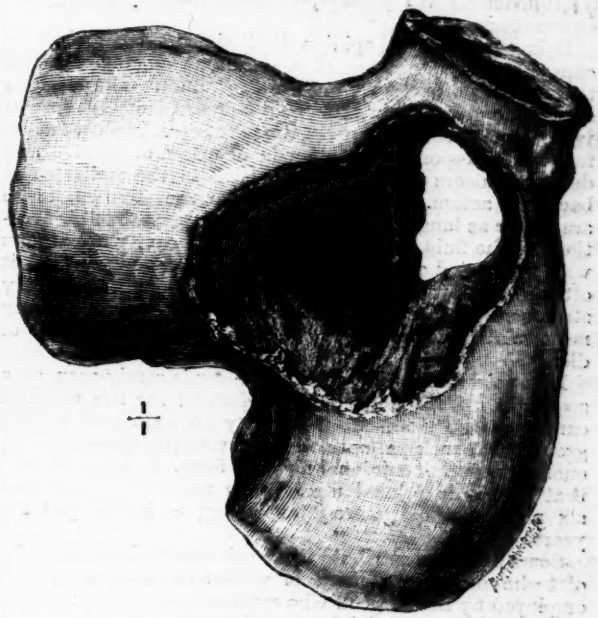

FIG. 7.—The limb of jejunum in the preceding figure opened from behind to show the almost complete effacement of the valvulae conniventes.

and, on detaching it, an irregular opening appeared in the efferent limb near the gastro-jejunal junction (Fig. 5). The segment of stomach and the cylinder of jejunum involved in the junction were cut away. The opening in the stomach was closed with silk sutures and the cut ends of the jejunum were joined, end to end. The man recovered easily and quickly. The changes that have taken place in the tissues of the jejunum adjacent to the new stoma are remarkable. Normally, the mucous membrane of the jejunum is thick and thrown into folds, the familiar valvulae conniventes (Fig. 6); but in this specimen the jejunal mucous membrane in the vicinity of the new stoma is thin; the valvulae are effaced (Fig. 7) and the muscular coat is thin and transparent. The hole occupies the efferent limb of the jejunum, just beyond the cicatrix marking the union of the stomach and gut.

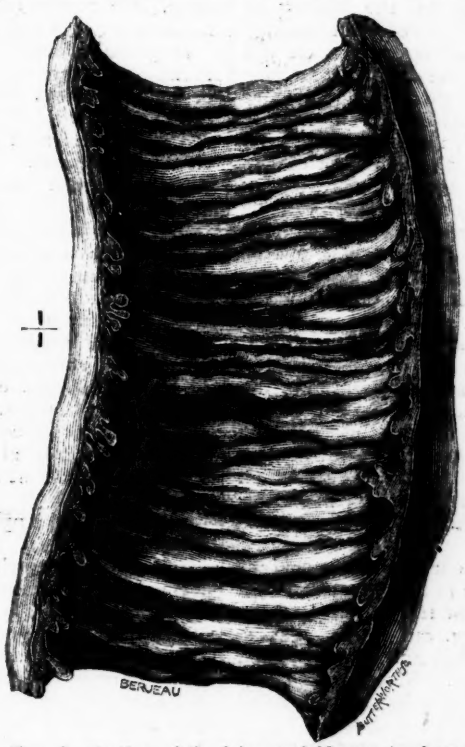

FIG. 6.—Portion of the jejunum laid open to show the valvulae conniventes.

A consideration of the structural alterations of the jejunum in the neighbourhood of the new stoma resulting from gastro-jejunostomy leads to some conjectures of high interest. There are no valvulae conniventes in the first 4 or 5 cm. of the duodenum, and its wall is thinner than in the remaining portion; it is often dilated, and forms the bulbus duodeni.

A remarkable transformation occurs in the jejunum when the escape of chyme from the stomach is transferred, in consequence of gastro-jejunostomy, directly into the jejunum. The wall of the jejunum receiving the impact of chyme ejected through the new stoma becomes attenuated, the valvulae disappear, and the jejunal walls assume the peculiarities of the supra-ampullary segment of the duodenum. This change entails a liability to ulceration, so common in the duodenum. Thus surgery,

by changing the environment of a segment of the jejunum, has evolved during this generation a new variety of ulcer. The time required to induce a segment of the jejunum to assume the characters of the supra-ampullary portion of the duodenum will probably be determined by subsequent observations.

It is the common opinion that the duodenal ulcer is caused by the impinging of acid chyme ejected through the pylorus on to the wall of the duodenum. The features surrounding the origin of a jejunal ulcer following gastro-jejunostomy seem to support the percussion theory, but so far the discussions on the mode of origin of gastric and duodenal ulcers pay but little regard to the influence of bacterial action. Most of us believe the stomach to be amicrobic as long as it can expel its contents, but observations on the fluid found in the abdominal cavity of patients with perforated gastric and duodenal ulcers prove that it often swarms with pathogenic micro-organisms, especially streptococci. These are introduced with food, especially milk, wittily described as "our most polluted article of diet."

It is noteworthy that a jejunal ulcer is rarely seen as a sequel to gastro-jejunostomy performed for the relief of cancer of the stomach. This may be explained on the ground that such patients rarely survive the operation long enough to permit a jejunal ulcer to form. It is established that a "peptic jejunal ulcer" may make its appearance six months after gastro-jejunostomy, or be delayed ten years.

Some surgeons attribute these secondary ulcers to faults of technique, or a method of suture different from that employed by the surgeon who criticizes the report; or the suture fails to completely control the bleeding from the cut edges of the gastric or the jejunal mucous membrane, and a haematoma forms.

There is very little evidence available for the incrimination of silk or linen thread; persistent sutures have rarely been found associated with secondary ulcers of the jejunum.

Indirect Operations on the Viscera.

Few things are more remarkable in the history of surgery during the last quarter of the nineteenth century than the origin and development of operations on the viscera. This advance was the outcome of two discoveries —anaesthesia and antisepsis. Surgical boldness and dexterity have always been available, but after the discovery of anaesthesia surgical rashness knew no bounds, but sepsis curbed it. Since the detection of the cause of sepsis, and the discovery of means for preventing it, surgical enterprise has been safeguarded.

In dealing with the viscera surgeons advanced tentatively. The effects of the removal of a particular viscus, or even a portion of it, on the physical efficiency of the individual were unknown. The internal reproductive organs of women were regarded with almost fetish reverence. Instead of removing the uterus when occupied by fibroids, surgeons removed the ovaries with the hope of establishing an artificial menopause and inducing the fibroids to shrink. Gradually men realized that the ovaries are the dominant organs of sexual life. So with the prostate. Ignorant that a big prostate could be enucleated, surgeons, actuated by false ideas as to the effects which followed removal of the ovaries, excised the testicles, or divided the vasa deferentia, with the hope of causing the prostate to atrophy.

In the case of the intestinal tract surgeons were content to make an artificial anus in order to relieve obstruction caused by cancer of the colon or of the anus. In 1881 Bryant, in the course of making an artificial anus, stumbled on a cancerous constriction, and the operation ended as an impromptu colectomy. Since that event resection of the bowel and short-circuiting have reduced colostomy to the position of an operation of despair.

The class of operations just considered may be called indirect operations — they may relieve the patient but do not remove the disease. To this class gastro-jejunostomy for the relief of duodenal ulcer may be added.

It is admitted that the most favourable conditions for gastro-jejunostomy are a pylorus blocked by an inflammatory mass, and a stomach with muscular tissue sufficiently vigorous to propel the chyme through the new stoma. A dilated stomach with an unobstructed pylorus is so unfavourable for gastro-jejunostomy that surgeons are at their wits' end to devise means for closing the pylorus, not only to compel the chyme to take the new route, but also to hinder an efflux of bile through it into the stomach. With an unobstructed pylorus gastro-jejunostomy cannot be relied on to cure a chronic duodenal ulcer, and as it exposes patients to the discomforts and risks of regurgitant vomiting and jejunal ulcers, I have gradually abandoned it as a routine method and prefer to excise the pylorus and the segment of duodenum containing the ulcer.

The Pylorus.

It is difficult to describe with certainty the functions of the pylorus. That it delays the efflux of chyme cannot be denied, but the rapidity with which a foreign body is discharged from the stomach into the intestine indicates that its controlling influence is by no means great. Smooth foreign bodies under 1 in. in diameter when swallowed are soon propelled through the pylorus.

In the course of operations the normal pylorus, when first exposed, is usually firmly contracted. A few minutes later it dilates, and, except for the vein that marks the boundary between the stomach and the duodenum, the pyloric sphincter is not easily seen. When the pylorus is excised it usually admits the index finger easily, but after the parts have been immersed in preservative fluids such as a mixture of alcohol and water or formalin solution, they contract and the orifice is quite small.

The examination of museum preparations gives a false idea of the size of the pylorus and also of its functions. I believe the pylorus is extremely sensitive. Like the buccal and anal sphincters, it gives no indication of its existence unless chapped or ulcerated. A chapped lip makes feeding painful; an ulcer near the pylorus makes digestion an ordeal; and an ulcer at the anus makes defaecation a daily terror.

One day I had stretched the anal sphincter of a man to relieve pain caused by an ulcer. Crossing the garden with my house-surgeon shortly afterwards I asked him which he considered more painful, a chapped lip or a fissured anus. He replied: "I don't know, for at the present moment I've got both."

Duodenal ulcers may be mere dimples in the mucous membrane, others (miscalled fissures) deeply eroded pits, or narrow ulcers extending through the mucosa to the muscular tissue. It is conceivable that when irritated by the passage of acid chyme a spasm is set up producing painful sensations.

The common form of dilated stomach—nicknamed splashy stomach—which was mainly responsible for bringing routine gastro-jejunostomy into disrepute, is worth some attention. I believe it is caused in some cases by spasmodic closure of the pylorus. Just as the small painful ulcer, or fissure, of the anus leads to irritative action of the anal sphincter, often ending in dilatation of the rectum and the pelvic colon, so repeated spasmodic contraction of the pyloric sphincter will produce dilatation of the stomach. Convinced of this correlation of events, I have excised the pylorus in such cases, with good consequences, but on the whole the conditions which give the best results to this mode of treatment are those in which there is a gross lesion at the pylorus.

Excision of the pylorus cannot be regarded as a serious physiological loss. Removal of the pyloric half of the stomach or of the whole stomach does not interfere with the nutrition of the body. I removed the stomach from a woman, aged 35, for cancer. She survived the operation three and a half years. A year after the operation she reported herself, and at that time was in excellent health. She complained that she could not eat so big a meal as her husband, but she made up the difference by "eating two meals to his one."

It is surmised that the pyloric sphincter hinders the premature escape of undigested food into the duodenum. It has also been suggested that spasmodic closure of the pylorus, originating reflexly from the ileum, is protective against overloading the small intestine with insufficiently digested food. This is amusing, for the idea presupposes the existence of mentality in bowels, a function usually regarded as the exclusive property of the cerebrum. Keith's observations on the islets of ganglionic nerve

tissue in the walls of the intestine suggest that thoughts may arise in a man's bowels as well as impulses suggesting ideas; indeed, Menenius Agrippa's famous fable of the Belly and the Members may have more foundation in fact than the retort of Balaam's ass.

The Technique of Pylorectomy.

When the conditions are favourable, excision of the pylorus, to surgeons accustomed to intestinal operations, is a simple matter. Favourable conditions mean a narrow and elongated pyloric segment of the stomach and the absence of adhesions between the pylorus and the liver, or the pancreas, or the transverse colon. The disparity in thickness of the gastric and duodenal walls is embarrassing to the operator, but with practice the difficulty disappears. Extensive adhesions to the pancreas or to the liver are a bar to pylorectomy. The supra-ampullary segment of the duodenum is occasionally much shorter than usual and makes the suture of the cut end of the stomach to the duodenum a difficult proceeding. In the method I employ, the abdomen is opened by a median supra-umbilical incision. The parts in the neighbourhood of the pylorus are examined in order to verify the diagnosis. The condition of the stomach is investigated as well as that of the gall bladder. When the conditions are favourable for pylorectomy, the vessels are clamped and stripped from the pyloric region of the stomach, and the loose tissue between the supra-ampullary portion of the duodenum and the pancreas carefully detached, and all bleeding vessels secured with forceps. When the pylorus is sufficiently freed from its attachments a clamp is applied to the stomach, about 5 cm. from the pylorus; the duodenum is clamped beyond the situation of the ulcer, and the pylorus excised. This is the best stage of the operation in which to ligature the vessels as they are well exposed and easily accessible.

The cut edges of the duodenum and stomach are sutured in the manner of an end-to-end anastomosis. I always use thin sterilized silk for this purpose and for ligatures. It is tedious and unnecessary to describe in detail the methods available for sewing the cut end of the duodenum to the hole in the stomach. It is like stitching a sleeve in a shirt; the clever sempstress varies her methods according to the material and the size of the garment. So with the surgeon. In a case of extensive resection (Fig. 3) the line of suture in the stomach was 6 in. across. Not wishing to imperil the safety of such a long line of suturing by joining the duodenum to it, I implanted the cut margins of the duodenum into a fresh opening in the posterior wall of the stomach.

In spite of the careful ligature of vessels, there is usually some post-operative oozing from the tissues in the wound area, and it is wise to drain for forty-eight hours. The abdominal wound is closed with through-and through sutures, the fascia being brought into apposition with intermediate sutures of thin silk.

The first patient I submitted to pylorectomy for duodenal ulcer was a woman, aged 35, at the Middlesex Hospital, in 1909. Gastro-jejunostomy had been performed three months previously, but the pain remained unrelieved. I excised the pylorus and the segment of the duodenum containing the ulcer. She made a quick and uneventful recovery. I have since lost sight of this patient. A few days later, when operating on a man for a duodenal ulcer, I found the conditions so favourable for pylorectomy that I excised the pylorus and the bulbus duodeni with the ulcer. Six years later I re-examined him with the help of *x* rays and an opaque meal and found the gastric efflux satisfactory.

I have excised the pylorus for chronic duodenal ulcer, according to the method just described, in twenty patients. In three of them I had previously performed gastro-jejunostomy. In one the symptoms returned three months after the gastro-jejunostomy, in another six years, and in a third two years. One patient, the sixteenth in the series, died. He was a man aged 38, transferred from Dr. Wynter's ward, with typical symptoms of chronic duodenal ulcer. At the operation an ulcer was found close to the pylorus on the anterior wall of a well-marked bulbus duodeni. I departed from my usual method and sewed the cut edges of the mucous membrane with catgut. The man made good progress until the fifth day, when his temperature rose to 103°. He died on the nineteenth day after the operation. The suture line had sloughed in two spots. I attributed the unfavourable result to the use of catgut.

Summary.

Since the treatment of duodenal ulceration passed into the province of surgery it has become the routine practice to perform gastro-jejunostomy for its relief, in the hope that, by diverting the chyme through the new stoma into the jejunum, the ulcer will heal. If the pylorus is obstructed by the ulcer the results are usually good, because the chyme must flow through the new stoma, but when the pylorus is patent the chyme flows through it, and in some instances ignores the new route. This is not imagination, for the efflux can be watched with the help of an opaque meal and *x* rays. I believe it is better, whenever practicable, to excise the pylorus with the ulcerated portion of the duodenum and rejoin the stomach and duodenum on the principle of an end-to-end anastomosis. If this method could be made safe, gastro-jejunostomy for the relief of chronic duodenal ulcer with an *unobstructed* pylorus would soon be abandoned.

Experience proves that posterior gastro-jejunostomy with an *obstructed* pylorus is a beneficent operation, in spite of the risk the patient runs of getting a new ulcer for an old one. The new ulcer has been evolved during this generation by alterations in the environment of the jejunum brought about by surgery.

ANTENATAL CLINICS AND PREMATERNITY PRACTICE AT THE EDINBURGH ROYAL MATERNITY HOSPITAL IN THE YEARS 1909-1915.

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(Continued from p. 236.)

Autumn Quarter, 1914.

The autumn quarter of 1914 saw 40 patients pass through the prematernity ward. Of these women, 7 were admitted for "convenience," and in this year "convenience" meant generally that these expectant mothers were the wives of Reservists and Territorials who had been summoned to the colours on the outbreak of the war. Even in these cases, however, it was a comfort to be able to make certain by actual pelvimetry that the pelvis was normal and the chief bodily systems healthy. Seven other women were kept in the ward on account of pelvic contraction; in 5 of them induction of premature labour was carried out, 1 was sent home as the date of induction was not due for some time, and in 1 (on whom it had been necessary to perform pubiotomy before) there appeared to be a permanent enlargement which permitted the natural delivery of a living child. In one of the induction cases living twins were brought into the world, but both died when two days old; in 2 the child lived, and in the other 2 it perished (in one instance antenatally and in the other after birth). In all these induction cases it was a great advantage to be able, daily if necessary, to test whether the head could engage in the pelvic brim by means of the Müller manœuvre; thus the best time for induction could be chosen. There was one other woman upon whom induction was performed, but in her case the operation was carried out because of the large size of her previous babies, causing their intranatal death; a living child weighing 7 lb. was successfully delivered and survived.

An interesting case was that of a woman whose previous four children had all been dead-born. She was sent in because she was becoming melancholic. For four weeks she was kept in hospital and her various functions regulated. At the delivery the cord was round the neck and arms, but a living and surviving child was born and the melancholia rapidly disappeared. Two other women were admitted on account of melancholia. One of them had albuminuria and suffered from condylomata of the vulva, but her blood gave a negative Wassermann reaction; the albuminuria was treated and she was safely delivered of a healthy infant. The other patient had signs of pyelitis

but was delivered normally, and the only sign of mental trouble after labour was shown by the fact that she had got out of bed one night and burst the sutures which had been put in to close a small perineal tear. Two other cases of albuminuria received dietetic treatment, etc., in the ward, and both were successfully delivered and had living and surviving infants. Another patient, in addition to the one named above who suffered from melancholia, was believed to be the subject of pyelitis, and she certainly exhibited some of the signs and symptoms thereof; but she was very discontented in the ward, and went home at her own wish before her delivery.

Hyperemesis Gravidarum complicated by Pyelitis.

This was the only case which terminated fatally to the mother. The woman was a 2-para, 21 years of age; her previous pregnancy and labour had been normal. On admission, when in the seventh month of gestation, she was pale, had marked carotid pulsation in the neck and in the external jugular vein, a small and rapid pulse, but regular and with no dicrotisms, and systolic bruits could be heard in all the cardiac areas. The heart was enlarged, especially to the right side. The only heart symptoms were faintness and giddiness if she suddenly assumed the erect position. There was an irritable cough, troublesome at night, and to it was ascribed the vomiting; the examination of the lungs revealed harsh breath sounds but no other anomalies. Before admission she had been seized with numerous rigors, by pain over the right kidney, and by sickness and vomiting. She was treated for pyelitis by her own medical man, but the vomiting and pain over the kidney continuing, he sent her into hospital. There was a trace of albumin in the urine, and a culture of the *Bacillus coli* was obtained from it. She had a temperature of 102.4°, and a pulse-rate of 120. She was put to bed, and an enema was given; milk diet was ordered, and she was given cystopurin and potassium citrate for the renal condition and two kinds of sedative cough mixture, but the latter remedies had to be stopped because of increased sickness.

All the symptoms, save the vomiting, disappeared, and even the sickness was improved. Three weeks after admission she passed into labour, and was delivered of a macerated fetus weighing 4 lb. 6 oz. The placenta was very friable and had numerous infarcts in it. Her recovery proceeded rapidly; she was able to eat and enjoy ordinary food, but on the fourth day of the puerperium she suddenly became blue in the face, sat up in bed for a few seconds, and fell back dead.

The *post-mortem* examination by Dr. Drennan revealed a dilated heart with a thin-walled right ventricle, emphysema of the upper lobes of the lungs but no embolism, healing septic nephritis of the right kidney, septic endometritis, and toxaemic changes in the other organs.

There were two other cases of vomiting. In one of these the woman gave birth to a macerated fetus and recovered; in the other the hyperemesis (at the third month) was controlled by treatment, and after a fortnight's stay in hospital the woman returned home well and with her pregnancy continuing. There were two instances of diarrhoea, in both of which a few days' treatment in the hospital sufficed for cure, and the women went out, their pregnancies uninterrupted. There was also a severe case of

Gastric Ulcer.

The patient, a 1-para of 24 years, was in hospital for eleven weeks in all; at the end of the eighth week she gave birth to a living male child, weighing 8 lb. 2 oz., and notwithstanding many dangerous times (on one of which she had a temperature of 106° and a pulse-rate of 136), she recovered and was able to leave the hospital. Her child also throve well. Her case will probably be published separately, as it was one of much interest. It was the most anxious one during the quarter.

The remaining cases may be summarized as follows: Two heart cases, one of which resulted well for both mother and child, whilst in the other abortion had to be induced with the loss of the fetal life; a case of epilepsy, in which, after a week's stay in the ward, the mother returned home to await her confinement; a marked case of chorea gravidarum in which treatment with large doses of calcium chloride for a fortnight was sufficient to enable the woman to return to her home (the pregnancy continuing); a case of phlebitis affecting both legs, in which after six weeks' stay in hospital labour came on with the birth of a living child weighing 9 lb. 10 oz., and in which there was a threatening of a return of the phlebitis in the puerperium; 2 cases of cystitis—one accompanied by a threatened abortion—in both of which the patient was able to leave the hospital relieved (pregnancy continuing); a case of *post-partum* haemorrhage in a previous labour, in which there was again haemorrhage, kept in check by an intrauterine hot douche and pituitrin and ergotin; a case of vulvo-vaginitis and urethritis, under treatment for a month, in which the child was born prematurely and succumbed a few days later; a case of spurious pains, in which twins of the same weight, which survived, were born four days after admission; a case of injury to the abdomen in which the fetal heart for a time was 180 per minute and the movements very active; and a case of miscalculation of the date of delivery or possibly of post-mature labour. There was, finally, a very interesting case of a woman who possessed only one kidney, and upon whom the phenolsulphone-phthalein test was carried out and gave so satisfactory a result that it was decided to allow the pregnancy to proceed. This case also will probably be published separately.

As a result of prematernity work in the autumn of 1914, 40 mothers passed through the ward, of whom 39 recovered or left relieved, their pregnancies continuing, whilst one—the case of hyperemesis, dilated heart, and pyelitis—died from heart failure in the puerperium. Of the 29 mothers who remained in hospital for delivery there were 31 infants born (twins twice); 23 of these were living at birth and survived, whilst 4 were born dead and 4 more died a few days after birth. Eleven mothers left to be confined in their own homes.

Autumn Quarter, 1915.

The patients who received prematernity treatment in the autumn quarter of 1915 were more numerous but perhaps less interesting than in any previous year. In all they numbered 44; but one who was sent in as a pregnancy was found to be really a case of pseudocyesis, and thus the pregnant patients were reduced to 43. No less than 9 of them were admitted for causes which are difficult of definition, but which may best be denominated "convenience," including under that word poverty, homelessness, desertion by husband, and minor troubles. One of them, a girl of 16 years, was kept in the ward, as it was possible that medico-legal proceedings might be instituted after her delivery.

No case of eclampsia was dealt with in the prematernity ward (there were 8 cases of eclampsia during the quarter, but none of them entered the hospital until labour was in progress), but there were 9 women who were treated on account of marked albuminuria with pre eclamptic symptoms. They were not the only albuminuric patients who received treatment, but they were the only ones who got it before delivery. Of the 9, 5 were confined in the hospital during the quarter, 3 of them having living and surviving babies (one with a harelip and cleft palate), and two expelling dead fetuses. Three went out of hospital with their condition much improved, and with pregnancy continuing. The other albuminuric was still in hospital at the close of the autumn quarter; she was confined prematurely about a month later, and died immediately after the third stage; there was no *post-partum* haemorrhage, but her symptoms resembled those of "shock." She had exhibited marked signs of hypothyroidism during her pregnancy. She and two others of the albuminuric patients had had eclampsia in a previous confinement. Her baby (premature) died soon after birth.

The patients admitted for "convenience" and for albuminuria constituted 18 out of the total of 43. The causes for which the remaining 25 were admitted differed very widely. There were 3 cases of hyperemesis; in all of them treatment was so satisfactory that the mothers were able to return to their homes, their pregnancies proceeding normally. There was also a case of vomiting late in pregnancy in a very anaemic woman; but under treatment (iron, etc.) she was safely delivered of a living and healthy child, which weighed 6 lb. 9 oz. There were 3 cases of threatened abortion in which the miscarriage was staved off, and one in which, although the abortion was prevented at the time, it occurred a month later. There were two instances of hydramnios, in one of which the membranes were artificially ruptured and a macerated fetus was expelled; whilst in the other the same treatment resulted in the premature birth of twins, who did not long survive birth. The two mothers did well. Three women were in the ward on account of pelvic contraction; in one of them pregnancy was allowed to go to the full term, and I performed Caesarean section with a happy result for both mother and child; in the other two premature labour was induced, and whilst one of the infants survived, the other died in a few days. One pregnant

woman was admitted because in previous gestations she had given way to drink in the last month; she was kept out of temptation's way in the hospital, and both she and her infant did well.[1] Another woman was admitted on account of a sharp attack of *Bacillus coli* infection of the urinary tract; she had had a retroversion of the gravid uterus which had been replaced accidentally before admission; both she and her child did well. In 2 cases the cause of admission was *ante-partum* haemorrhage; in the one ("accidental haemorrhage") a month's residence in the hospital was followed by the birth of a healthy child, which survived its birth, and in the other, after ten days' rest in the ward, the mother was able to go home, her pregnancy continuing normally. In 6 other cases the cause of admission to the prematernity ward was severe constipation (1), oedema of the labia (1), cystocele and prolapse (2), and vaginitis (2); in all a good result was obtained—4 of the women were delivered of living children and the other 2 were able to return home with their pregnancies continuing.

Two other cases remain to be referred to:

Heart Disease.

One was that of a delicate primipara, who spent several longer and shorter periods in the ward; she suffered from recurring attacks of faintness and of actual syncope, and auscultation revealed a systolic aortic murmur. She was more or less under treatment for the whole quarter, and she continued to attend the hospital until November 23rd, when she was safely delivered of a healthy child (6 lb. 12 oz.), and both mother and child did well.

Cerebellar Tumour.

The other case was that of a primipara, a married woman, who was suffering from the effects of a cerebellar tumour. She was in the ward when I came on duty on July 1st and her condition was deteriorating fast; indeed, before her delivery occurred she became quite blind and deaf; she gave birth to a living healthy child on July 5th, but died on the eighth day of the puerperium. Although so helpless when her infant was born, she was evidently able (by the look upon her face) to tell what had happened, and it was a touching sight to see her holding the baby in her arms.

The results of the prematernity work in the autumn of 1915 may be summarized as follows: Of the 43 pregnant women 12 left the hospital cured of the trouble for which they had been admitted and continuing their gestations, and 31 were delivered in the hospital, of whom 29 made good recoveries and 2 died, one being the patient with the cerebellar tumour and the other being the albuminuric patient who had in a previous labour suffered from eclampsia. The 31 mothers who were confined in the hospital gave birth to 32 children (twins once), of whom 24 left the hospital alive, 4 were macerated at birth, and 4 (all premature) died a few days after birth.

Table showing the Main Results of the Prematernity Work during the Autumn Quarter for the past Seven Years in the Edinburgh Royal Maternity Hospital.

Years.	No. of Cases.	Mothers.			Infants and Fetuses.		
		Lived.		Died.	Alive.	Dead.	
Autumn of—		Undelivered.	Delivered.			Antenatal.	Postnatal.
1909	32	7	24	1	16	8	2
1910	29	12	17	0	14	2	1
1911	26	5	20	1	16	7	0
1912	36	2	33	1	17	17	3
1913	32	4	26	2	21	5	4
1914	40	11	28	1	23	4	4
1915	43	12	29	2	24	4	4
Totals	238	53	177	8	131	47	18

With regard to the 8 maternal deaths, 2 only (those due to croupous pneumonia and acidosis) really occurred while the patient was in the prematernity ward; the remaining 6 all took place after delivery, and 2 of them after my quarter on duty in the hospital was over; at the same time they were all, save the cases of croupous pneumonia and cerebellar tumour, due directly or indirectly to the state of pregnancy (hyperemesis, acidosis, albuminuria with hypothyroidism, phlebitis, and gastric ulcer).

The number of fetal deaths is high—47 out of 196—but it must be remembered that I have included all the abortions (and one was a triplet miscarriage), for every abortion is really a fetal death; and I would also emphasize the serious nature of so many of the maternal states. The number of infants who perished after birth (including premature births) is not, I think, large when all the circumstances are taken into consideration; it was 18 out of 149 who came into the world alive. Fifty-three pregnant patients (out of 238) left the hospital with their pregnancies continuing, and there is reason to believe that most of them ended happily, although details were not always available; the conditions for which they had been admitted and treated were generally of the nature of threatened abortion, excessive vomiting, accidents (falls, etc.), varicose veins, diarrhoea, retroversion of the uterus, cystitis, and spurious pains. One of the most striking results of the prematernity work was the treatment which it was possible to give to 31 mothers suffering from well-marked albuminuria. In only one of these cases did eclampsia develop, and that was in one of the 1909 patients before I had learnt that more than dietetic management was necessary. None of these patients died whilst under my care; but one in which there was a strong element of hypothyroidism ended fatally in the third stage of labour in the succeeding quarter.

Conclusions.

The following conclusions may, I think, safely be drawn regarding prematernity work in a maternity hospital:

1. A prematernity department is an essential part of a properly-equipped maternity hospital, and it ought to consist of a pregnancy ward, antenatal clinics, and of prenatal nurses (in the extern work).

2. Among the good results coming from it may be reckoned the saving of lives (maternal and infantile), the relief of maternal suffering, the possibility of supervising antenatal hygiene, and the teaching of the normal and abnormal conditions of pregnancy both to students and to post-graduates.

3. The maternity hospital which has such a department will probably have a higher death-rate, for it will inevitably attract to itself cases of a very grave type; but these patients must be treated somewhere, and they will have a far better chance of recovery in the prematernity ward with adequate nursing and skilled medical treatment than in their own homes.

4. The diseases which will be specially benefited by prematernity treatment will probably be albuminuria, eclampsia before the supervention of labour, hyperemesis, chorea, acidosis, threatened abortion cardiac complications, anaemia, chlorosis, hydramnios, phlebitis, pyelitis, and the *ante-partum* haemorrhages before the onset of labour; but the ward will also offer advantages to patients waiting for the induction of premature labour on account of pelvic contraction or previous dead-births from any cause. Less common indications for admission will be found in melancholia, alcoholism, jaundice, gastric ulcer, myxoedema, mucous colitis, phthisis, recurrent abortion or fetal death, haematuria, injuries, etc.; and, indeed, many other uses for the ward will be found after its opening.

5. Further benefit will accrue from the establishment of a well-equipped laboratory, in which the finer methods of clinical investigation can be carried out, as well as by the securing of the services of a pathologist skilled in the special morbid anatomy of the fetus, embryo, placenta, membranes, and liquor amnii.

Reference.

[1] Alcoholism and Antenatal Hygiene, *British Journal of Inebriety*, 1915, xiii, p. 87.

According to the *Riforma Medica* the total number of legally qualified doctors in Italy is 22,705, a proportion of 6.3 to 10,000 of the population of the country. The number of foreign practitioners is about 130. Of these some 85 hold an Italian degree which gives them a general right to practise; 25 who have no Italian licence can practise only among patients of their own nationality, and 20 who hold diplomas from British licensing bodies are entitled to practise under the reciprocity agreement between the two countries.

Reports of Societies.

TRENCH NEPHRITIS.

AT a meeting of the Sections of Medicine and of Pharmacology and Therapeutics of the Royal Society of Medicine, on February 15th, Dr. LANGDON BROWN opened a discussion on trench nephritis. He said that acute nephritis was not a common disease in civil practice; at St. Bartholomew's Hospital, with an average annual admission of 7,000 medical cases, there were in five years only 26 cases of acute nephritis in men of military age. Whereas dysentery and typhoid had dogged most campaigns in the past, acute nephritis usually had not. It was very rare in the South African war, but in the American civil war there was a very considerable outbreak, which assumed epidemic proportions between March, 1862, and March, 1863. Throughout that war there were 14,117 cases, and it was interesting to recall that the military conditions resembled those of the present war. There was the dash forward of the Confederates, which was checked and followed by prolonged trench warfare. The epidemic in the British Expeditionary Force had not reached such dimensions, but up to the end of June, 1915, there had been 1,062 cases, and they had not been diminishing since. Reports from Vienna showed that the enemy were also affected by the disease, which started about the same time as in our army, and as in the American civil war—that is, in March. Exposure as a cause was negatived by the facts of the rarity of the disease in South Africa and in the Russo-Japanese war, and also because it was not until the weather began to get warmer that the disease assumed epidemic proportions. A climatic cause would not explain an epidemic such as that in the American civil war, which lasted twelve months and did not recur in subsequent years of the war. Various other causes, such as the water supply, chlorination of the water, intestinal toxaemia, and acidosis had been suggested, but could be excluded. Only a few cases could be explained as an exacerbation of chronic nephritis. The French army surgeons had suggested that the epidemic was due to a suppressed form of scarlet fever, and it was interesting to note the immunity of the Indian troops from nephritis, as the inhabitants of India enjoyed comparative immunity from scarlet fever. Although this theory would not stand examination, it was important to note that the urinary and pathological changes in trench nephritis and scarlatinal nephritis were closely similar. Chemical tests showed that, as in a nephritis of infective origin, trench nephritis was glomerulo-tubular in distribution, and this had been confirmed by *post-mortem* examination in some of the few fatal cases. As to the nature of the infection, cultures from the blood, fauces, and urine had yielded no positive bacteriological results, but Dr. Mackenzie Wallis had obtained suggestive, though not conclusive, evidence of an ultramicroscopic filter-passing virus by injecting the urine, which had been passed through a Berkefeld filter, into rabbits and monkeys. A severe illness was produced after a latent period of eight days, which would exclude a mere chemical cause, and corresponded to the incubation period which had been observed clinically. Wassermann's reaction was positive in about one in every three cases. This did not mean that such patients were necessarily syphilitic, as other animal infections would produce a positive reaction. A filter-passing infection was believed to be animal in nature. A number of the cases had had symptoms of fever and malaise before the nephritis, but usually oedema was the first symptom. Shortness of breath had been a striking and very common symptom, starting at the same time as the oedema, but ceasing after a few days. Bronchitis was common, and a fair proportion of patients had complained of sore throat. Great reduction in urinary secretion was not so common as in ordinary acute nephritis, while great variations in the daily quantity were not uncommon. Haematuria sometimes continued long after all signs of active inflammation had subsided. Leucocytes, epithelial, granular and fatty casts were usually found in the urine, though blood casts and fatty casts were rare. Uraemic convulsions occurred occasionally, but generally yielded to free venesection. A considerable proportion of the cases recovered speedily, but if this did not take place, the duration might be prolonged for weeks or even months. The albuminuria often became intermittent before it ceased altogether. Relapse was not uncommon. Some, no doubt, were becoming chronic nephritics, but the immediate mortality was very low. He gave reasons for believing that the epidemic was due to a specific infection, probably resembling, but not identical with, the organism causing scarlet fever. He thought that animal inoculation experiments with material from recent cases were advisable, and suggested that much might be learnt as to the mode of infection by the preparation of maps showing the exact distribution of the cases.

Sir WILLIAM OSLER said that the disease had not been described before, with the exception of the records of the cases which occurred during the American civil war. Its main clinical characters were those of ordinary acute nephritis, and, like it, started quickly, and usually without any previous disorder. There were, however, certain peculiarities. The oedema was transient, and usually local; general anasarca was rare. Dyspnoea was unusually prominent. Slight fever was present in a few of the cases which had returned to England, but it was probable that it was more common in the earlier stages. The rapid improvement, which coincided with the disappearance of the dropsy, was remarkable, and an apparent restoration to good health with persistence of the urinary changes and a high blood pressure was common. Severe uraemic symptoms had occurred without dropsy and with only high blood pressure. Cases had been admitted showing albuminuria with casts and blood in the urine, but without a history of dropsy, the condition being detected only by urinary examination. Although it was the rule for the cases to end in recovery, yet death occurred in not a few. Of 113 cases at Taplow, 2 ended fatally; of 30 at Paignton, 2 more; and 1 was fatal at Oxford. It appeared that a larger proportion of deaths occurred than recent papers indicated. A *post-mortem* examination had been made in 3 of these cases. In one a typical large milky-white kidney had been found, identical, except for the absence of injected stellate veins, with the classical example described by Bright. There were no signs of fatty degeneration. In the second case acute nephritis had been superimposed on an old nephritis. In the third case the patient died from intercurrent pleuropneumonia. The kidneys were sclerotic, but there was also marked recent tubular and glomerular nephritis. The remaining 2 fatal cases were accompanied by uraemia and ended rapidly; no necropsy had been made. It was a good clinical rule that if in acute nephritis the urine did not become free from albumin by the end of the twelfth week the probability was that the condition would become chronic. There was evidence of persistence of the nephritis among those patients at Taplow who had been ill for more than ten weeks. Nine out of 14 had a high blood pressure. In 6 of the older patients high blood pressure was accompanied by commencing arterial changes. In 10 of the 14 the urine was of a low specific gravity. For these reasons he feared that many sufferers from this condition would never have a complete restoration of the functions of the kidney.

Dr. F. W. ANDREWES exhibited microscopical sections from six cases which he had examined histologically. He had only been able to obtain one example at an early stage. In that instance sudden death had followed cerebral haemorrhage, but the clinical evidence of a recent acute nephritis was fairly conclusive. Histologically he had found nothing indicative of acute nephritis, but only such changes as he would have expected to find in a man who had died from apoplexy. The remaining were specimens obtained from examples of typical acute nephritis, and were representative of severe trench nephritis. All showed changes in the glomeruli, tubules, and interstitial tissue. In the glomeruli was the usual proliferation of the epithelium of the capsule; in the tubules, degeneration and desquamation of the epithelium. Fatty changes were slight or absent. Some cellular infiltration occurred in the interstitial tissue, the infiltrating cells being chiefly leucocytes, whilst plasma cells were absent. This corresponded with the condition of the urine, in which a deposit of leucocytes was noticeable. In one case so many polymorphonuclear cells appeared in the urine that pyelitis was suspected. One case was an example of old-standing nephritis which had occurred three years previously, and upon which trench nephritis had been superimposed. There was nothing histological to

distinguish trench nephritis from other forms of acute and subacute nephritis. The acute glomerular nephritis of scarlet fever was comparable in all respects with trench nephritis. He had failed to find any micro-organism in the urine or kidneys.

Dr. MACKENZIE WALLIS, who had carried out pathological investigations to determine, if possible, the true nature of the condition and its origin, spoke first of the value of estimating the diastatic output as an index of the efficiency of the renal tubules. In no disease was this as low as in renal disease. In trench nephritis there was a definite relation between the severity of the case and the diastase content of the urine. Since the ferment was secreted by the tubules its diminution in the urine of these cases indicated that the tubules were affected, and the degree of its diminution indicated the extent of the damage. The test had also value in prognosis; diastase might still be diminished in the urine after the albumin had disappeared. There was no evidence of any protein being present in the urine other than serum albumin and serum globulin, as in ordinary nephritis, and they were present in the usual relative proportions. The amount of albumin varied from a trace to 0.3 per cent. as estimated by Esbach's method. Microscopically, casts were constantly present and were chiefly of the hyaline variety. There was a relative excess of white blood corpuscles, which was also characteristic of scarlatinal nephritis. In some cases there was retention of nitrogen even after the diastase excretion had returned to normal, and this had to be taken into consideration in determining the ability of the patient to return to duty. The nitrogen content of the cerebro-spinal fluid had been found to be raised when uraemia was present. In investigating the origin of the condition he had first considered the possibility of a co-existing intestinal toxaemia, but found that the ethereal sulphates in the urine were not in excess, but markedly diminished. With mineral poisoning the diastase content was also subnormal, but careful examination of the urine had failed to reveal the presence of any mineral poison. To discover a possible parasitic origin he had resorted to inoculation experiments on animals, using blood serum, cerebro-spinal fluid, and catheter specimens of urine. The urine was shown to be remarkably toxic, but the chemical characters of the toxic agent had not been determined. Apparently there was a powerful toxin circulating in the blood and excreted in the urine. He had repeated the experiments with scarlatinal nephritis, but obtained no results which were comparable. In the trench nephritis cases an illness was produced without exception on the eighth day. Two animals had died with albuminuria six days after injection, but *post mortem* there was no histological evidence of nephritis. Urine which had been heated to 55° C. produced no illness when injected, but an unheated filtrate did.

Dr. R. G. ABERCROMBIE, who had been working in France, had seen over 500 cases in the acute phase. In their early stages they presented the characteristics of acute nephritis of modern severity. The most constant symptoms were headache and dyspnoea. The blood pressure showed diurnal variations of from 30 to 60 mm. of Hg, the morning reading being low and the evening high. The bouts of dyspnoea were nearly always nocturnal, and it was therefore open to question whether they were due to the rapid rise of blood pressure. At the beginning of the disease fever was present, the temperature being about 101° F. In about half of the cases there were premonitory symptoms, these in order of frequency being bronchitis, pains in the back and limbs, and abdominal pains and vomiting. Tonsillitis was exceedingly rare, but laryngitis and tracheitis were more common. Convulsions had occurred in 14 cases, and for their treatment lumbar puncture and venesection, especially if accompanied by saline infusion, seemed valuable. Mania was met with in 4 cases, amaurosis in 3. Fundal changes were not seen in any during the first three weeks. Two occasional associations, herpes and bilateral parotitis, supported the contention that the condition was of infective origin. A well defined group could be separated in which the symptoms suggested pyelitis, cystitis, or prostatitis; in them oedema, fever, and rise of blood pressure did not occur, but casts might appear in the urine. Of some 500 cases 4 ended fatally, 1 before the end of the first week. The kidneys of this case showed but slight macroscopic changes. Microscopically the lesion was essentially one of the tubules, with some interstitial change. The spleen was enlarged and the tracheal mucous membrane granular. As regards the causation, the cases were scattered, but occurred chiefly at the front and in definite small epidemics. The men were more liable to the disease in certain areas. His own impression, based on the clinical symptoms and the characters of the epidemic, was that the disease was infective.

Rebiews.

THE PHYSICAL CHEMISTRY OF PHYSIOLOGY.

FROM time to time it has happily been the practice of eminent physiologists to write illuminating works in which their outlook upon the methods and philosophy of physiology is detailed and justified. Some twenty years ago, for example, this was done by Verworn, whose general account of physiology was written from the point of view of a protozoologist, and took the cell as the unit of physiology. Professor BAYLISS has now, in turn, published a most interesting and suggestive account of the *Principles of General Physiology*,[1] in which he regards the science from the point of view of a molecular physical chemist.

Such a mechanical point of view is, of course, not a novelty. Historically speaking, physiology has always been a highly derivative branch of science. In the main its progress has depended for inspiration upon other sciences, particularly physics and chemistry, or, less happily, upon abstract philosophy. As regards the great question as to the nature of life, during the last three centuries natural science has made such progress that all physiologists have been able to adopt a definite standpoint here and to build upon one of two foundations. Either they could assert that life was a mere succession of physical and chemical processes, or they could state that living organisms were ruled and animated by a new power, vital force. In this way two schools of physiology have grown up side by side, the mechanical and the vitalistic. Among the vitalists may be mentioned van Helmont, the school of Montpellier in the eighteenth century, and Johannes Müller and Bunge in the nineteenth century; among the mechanists, Descartes, the iatrophysical and iatrochemical schools of the eighteenth century, and to mention one out of the many more recent writers, Max Verworn. But there are still many vitalists among us who believe that the known laws of physics and chemistry are not adequate to explain the phenomena of living matter. Professor Bayliss is a confirmed mechanist, and, as has been said already, he sets out to explain vital phenomena in terms of mathematical physics and chemistry. The enormous progress that has been made in our knowledge of the laws of physical chemistry during the last thirty years, and in the study of the chemistry of colloids during the last decade, makes it possible for him to go a long way towards the mathematical exposition and solution of the problems of "vital force" with a thoroughness that was, of course, completely impossible for his iatrochemical and iatromechanical predecessors.

The book consists of twenty-four chapters, followed by a complete and up-to-date bibliography of eighty pages and by indexes. The first third of the text is devoted to an elaborate and most lucid exposition of the chemical and physical forces upon which all the processes of physiology depend. Surface action, the colloidal state, the permeability of membranes, osmotic pressure, electrolytes and their actions, the properties and functions of water, are all considered in turn. Wherever possible, Professor Bayliss discusses the energetics of the systems or modes of activity with which he deals; he is also at great pains to reduce all modes of chemical or physiological activity to mathematical formulas and equations, with the use of integration, log *e*, and the like. In the same way he makes free use of the Helmholtz theory of double electric envelopes, stepping boldly on ground where only the skilled mathematician and physicist will be able to follow him. Succeeding chapters of the book deal with such subjects as catalysis, nutrition, secretion, digestion, the phenomena of muscle and nerve in various aspects, receptor organs, the action of light, oxidation, respiration,

[1] *Principles of General Physiology*. By W. M. Bayliss, M.D., F.R.S., etc. London: Longmans, Green, and Co. 1915. (Roy. 8vo, pp. 870; 259 figures. 21s. net.)

and the circulation of the blood; the last chapter is given to the consideration of hormones, drugs, and toxins.

Throughout this part of the volume Professor Bayliss deals with the general physiology of living tissues rather than the particular case of man; his unit is the ion, the molecule, the disperse phase of a colloid solution, the surface of a membrane or supposed membrane, as the case may be, rather than the cell or the organ as a whole. His knowledge of the physiology of plants enables him to illuminate many of the complex processes of animal life by comparison with the simpler reactions or activities of the vegetable cell; he also makes numerous references to Gaskell's hypothesis as to the origin of the vertebrates. His object everywhere is to show how far the known laws of physical chemistry, using the term in its widest sense, can give an accurate explanation of vital processes in nature. He will have nothing to do with chemical theories or analyses that are incapable of mathematical expression, such as Ehrlich's side chain theory and toxin spectrum, for example; on the subject of the coagulation of the blood he writes, characteristically:

> In point of fact, it cannot be said that it is yet understood. Much of the research done has led to little more than the multiplication of names given to supposed substances held to take part in it, but these have not been isolated as chemical individuals, and the names really refer to aspects of phenomena. . . . As an illustration, I would refer to a paper . . . where we find the following names used as applying to definite substances: fibrinogen, prothrombin, prothrombokinase, anti-thrombokinase, thrombokinase, anti-thrombin, and anti-prothrombin. These are supposed to be present before clotting. After clotting we have: fibrin, thrombin, thrombokinase, anti-thrombin ?, anti-prothrombin, anti-thrombokinase, and prothrombin.

Undoubtedly science would gain by the abolition of most of these names and the obscurities attaching to the processes for which they stand. From his own point of view, Professor Bayliss describes the clotting of blood as follows:

> The coagulation of the blood is an interaction between certain colloidal systems under the influence of electrolytes, chiefly calcium salts. The intervention of surface action is shown by the accelerating effect of rough surfaces and by the action of lipoids.

In his last chapter, which is one of particular interest to medical men and experimental pathologists, the author gives good reasons for believing that Ehrlich's side-chain theory and chemio-receptors and chemio-therapy must now all go by the board, so far as they claim to give anything like a chemical picture of immunity, anaphylaxis, phagocytosis, the action of toxins and antitoxins, and the like. In their place he gives us physical factors and processes as adsorption, surface action, the permeability of cell membranes, the mutual precipitation or aggregation of inorganic colloids when mixed with protein solutions; and he entertains considerable doubt as to the alleged specificity of many of the reactions met with in the province of immunity. Opsonins, for example, may act only by adsorption and consequent changes in surface tension. Refreshing doubts also are cast upon the alleged specificity of many enzymes; Professor Bayliss holds that Emil Fischer's "lock and key" simile is, as a matter of experience, inappropriate here, and substitutes for it the kinetic view of velocities of reaction as more in accordance with facts.

As regards "vital force," his method of destruction is to show that it becomes less and less necessary to physiology in proportion as our knowledge of physics increases. Even so useful a conception as Clerk Maxwell's "sorting demon" appears to find no place in his scheme of intracellular mechanics.

It is impossible to do justice in a brief review to the wealth of learning in physics, chemistry, and physiology displayed by Professor Bayliss in this volume. However abstruse the subject, he succeeds in giving a clear account of it—even the Helmholtz double electric envelope, a conception most valuable in molecular physics, is rendered intelligible to the intelligent reader! His style is simple and not uninteresting; it is plain that his desire is to establish the merits of his own point of view rather than to attack and destroy the theories of rival physiologists, which he always treats with scrupulous fairness. It is possible that the volume would gain by condensation, and that certain points in it are treated with unnecessary fullness. The illustrations are excellent; a special feature of the volume consists in the inclusion of portraits of the most eminent physicists, physiologists and chemists who have contributed to the progress of the science, and the fact that no fewer than three portraits of the eminent Dutch physical chemist van 't Hoff are reproduced may be taken as showing the bent or bias of Professor Bayliss's physiology. The printing is good and the text is singularly free from misprints; the author makes a point of adopting the French rather than the German method of spelling Russian names, very properly, but oddly enough does not apply the method in the case of Metchnikoff.

Professor Bayliss is to be congratulated on the success with which he has applied the methods and mathematics of physical chemistry to the whole range of general physiology. He has developed and extended a new method of attacking old problems that yields most illuminating and suggestive results, and his general plan of campaign may undoubtedly be said to carry us a stage further in the comprehension and analysis of the various processes which result in the phenomena of life. His book should be read by all advanced students of physiology who have occasion or time to think of more than passing examinations. It will also be of great interest to medical men and general readers equipped with a knowledge of elementary chemistry and physics who are interested in the progress of pure science. It does not in any way take the place of such standard textbooks of physiology as those of Halliburton, Howell, Starling, or Stewart, but it provides the reader with a novel and most valuable philosophy on which to base his fundamental conceptions of the science.

MATERNITY AND CHILD WELFARE.

(Concluded from page 242.)

Commentary on the Official Scheme.

So far we have given a fair account of the official programme, and without commentary. There are certain points that immediately arise for consideration. First, the arrangement with the doctors for the work of the centres. Secondly, the hint of "notification of pregnancy."

So far as the medical staffing of the centres is concerned we may refer our readers to the report adopted by the Representative Meeting of last year. Sections 3, 4, 5, those most pertinent to this, are as follows:

> 3. That the present scheme of the Board is open to the objection that it is very likely to lead to the establishment of principles and methods which would in the long run vitally alter the present status of the profession, and the relation between doctor and patient to the detriment of both; but that these dangers are not a necessary outcome of the scheme if properly safeguarded.
>
> 4. That there would be a tendency under the scheme to the formation of a class of practitioners who will be wholly concerned with the treatment of disease in expectant mothers and in young children, and that almost the whole of actual practice among such patients may be withdrawn from the general practitioner; and that if the medical and surgical treatment of the public is to continue to be (as it should) in the hands of general medical practitioners, aided by suitable opportunities for consultative and pathological assistance, the effect of this must be seriously detrimental to public and profession alike.
>
> 5. That, correspondingly, if it be correct that the most satisfactory and valuable form of receiving advice and treatment is by means of the "family doctor," with considerable personal choice as to who that "family doctor" shall be, the scheme would have a tendency to lead away from this to the less desirable method of treatment by one or two officially appointed whole-time practitioners.

The report of the Association has been issued to the clerks and medical officers of some 1,300 sanitary authorities, and already some 600 additional copies have been asked for. But the latest central departmental memorandum does not bear the impress of a consideration of the report. The medical arrangements are left in the hands of the local committees truly, but the first official hint is that the duty should be undertaken by "an officer of the local authority"—that means a "tied" doctor, the servant of an authority, one lacking the healthy experience of free practice with its stimulating competition of ideas—and it probably means a whole-time official. Arrangements with local practitioners are only cited to hint at their difficulties.

"Notification of Pregnancy."

Twice in the latest report this new form of notification is referred to, and once in so many words.

The post-natal work of the Centre will depend for its success on the home visits made by health visitors under the Notification

of Births Act. There is no similar machinery for securing the *clientèle* for an ante-natal centre; and its success will depend on the co-operation of medical practitioners, and midwives, and of any voluntary agencies likely to send expectant mothers for advice to the Centre.

Again,

Some system of notification of pregnancy has been suggested, under the impression that this is a necessary antecedent to the commencement of an ante-natal Centre. Such notifications should not be made unless the express consent of the expectant mother has been previously obtained.

There appears to be something like a sigh of regret in these phrases that there is no such thing as a "notification of pregnancy." And that there is sorrow in the official heart at the lack we may find evidence in the "progressive" measures adopted by two local authorities which have boldly instituted this notification in their areas.

The city of Nottingham appears to be the first authority to attempt the task. We have the official form before us. It is a handsome document the size of a sheet of foolscap. There is a counterfoil. The back of the form is printed with the address of the medical officer of health for the city, and it is the evident intention that the form should be folded over and posted or delivered to him; no provision is made for the sealing of the document.

The main part of the form reads as follows:

CITY OF NOTTINGHAM.

NOTIFICATION BY A MIDWIFE OF HER ENGAGEMENT TO ATTEND A CONFINEMENT.

To the MEDICAL OFFICER OF HEALTH, Guildhall, Nottingham,

I hereby give you notice that I have to-day been engaged to attend

Name of Mother .....
Address .....
Expected date of Confinement .....

Is the patient a primi ara? ... If not:	Has the mother a complete set of baby's clothes?
Number of previous pregnancies	Has she at least:
Number of miscarriages	two nightdresses .....
Number of premature births	two pairs of sheets .....
Number of still-births	one waterproof sheet .....
Number of children born alive	one dozen diapers .....
Number of children still living	Are the home circumstances satisfactory? .....
Has any child suffered from ophthalmia?	Is the husband in work? .....
Has the patient had a previous difficult labour?	Is the lying-in room suitable? .....
	Is the mother well-nourished?
	Are there any signs or symptoms of complications of pregnancy? ... ...

(Signed) .....Certified Midwife.

Date..... ..... 191 Address .....

Huddersfield has gone one better than Nottingham, the euphemism "notification by a midwife of her engagement to attend a confinement" is dropped, and more than that—from "January 1st, 1916, the said Sanitary Authority will PAY THE SUM OF 2/6 (TWO SHILLINGS AND SIX PENCE) to each registered medical practitioner and to each registered midwife for each notification of pregnancy received from the said persons."

The official form for notification is nothing so handsome as the Nottingham. It is no more than a letter-card, the inside of which is type-written by a process machine, as follows:

COUNTY BOROUGH OF HUDDERSFIELD.

PUBLIC HEALTH DEPARTMENT.

Notification of Pregnancy.

Date..... 19.....

(*a*) Notified by .....
(*b*) that.....
(*c*) of.....

is expected to be confined on or about..... 19.....

(*a*) Name of notifier.
(*b*) Name of expectant mother.
(*c*) Postal address of expectant mother.

This scheme of notification promulgated by Huddersfield bears so recent a date as December 30th, 1915, so that it is not unreasonable to suppose that it represents what is the most desirable form of procedure and a reflection of the latest views of the Government department concerned.

The immediate questions that arise on a knowledge of these schemes are: What good are they supposed to serve? and, how are they looked upon by the women immediately concerned? Dr. Newsholme's report states that pregnant women commonly engage their midwives to attend them about two months before the date of the expected confinement. From inquiries amongst those who have most to do with the midwives we learn that this is a fair estimate. Formerly the date was earlier, but now there is a tendency to a delay in the booking. The present tendency to delay has been brought about by the maternity benefit of the National Insurance Act; before that came into force poor women joined maternity clubs, and put by a shilling a week or so whilst "carrying," so as to pay the midwife; they therefore joined their clubs and booked their midwives early. Now the midwife's fee is secured by the maternity benefit, so that there is no necessity for the help of a maternity club, and the booking is delayed.

The midwives fear that such schemes of notification as these will still further delay the booking of their patients, and they rightly point out that any good that can be brought to bear on antenatal development is proportionate to the earliness with which the expectant mother can be seen and advised.

There is another and very strong objection in the minds of the midwives to this scheme. They maintain that antenatal care is most likely to be fostered by improving the knowledge and capability of the midwife, and that this scheme, by the interposition of a visitor between them and their patients, will reduce the sense of the midwives' responsibility. The midwives point out with reason that they are as keenly interested in the health of their women as any one; that their duties are enforced by the stringent rules and control of the Central Midwives Board, and that any possibility for the betterment of the women entrusted to their care would be warmly welcomed by them. What they want, they say, is not more advice—and this is to be the main stock in trade of the maternity centres—but more facilities for the prompt medical treatment of the women they find or suspect to be unfit, and the facilities for treatment of the centres is meagre in the extreme. To refer a sickly pregnant woman for another examination at a strange centre, where again she may be told to go to a doctor for treatment, is not to forward the interests of that woman; indeed, the double trouble and pulling about is likely to sicken her of medical examination, and needed treatment will go by default. Give us, say the midwives, facilities for the proper treatment of our women at the hands of experienced doctors, and antenatal work will grow apace.*

There is another side, that of the pregnant woman. How will she look at this notification of her condition? Pregnancy is a matter both of pride and shamefacedness with the women, and this is especially so with primiparae, who are the most important from the point of view of any antenatal scheme. Their peculiar condition makes them exceedingly important, and very difficult, personalities, and they are not easily persuaded of the benefit of the advice of "authorized" strangers. The prospects of difficulty with such a scheme, and the very real prospect of frightening off shy mothers from going as early as they should to their doctors and midwives, makes one ask whether the scheme is worth the risk. The scheme does not so much as propose the advantages of the "mothers' kitchens," which prepared good meals for the women at cost price as a seasoning for the same free advice, and, further, showed the women how to cook these nice meals.

On the strict test of logic the scheme is wrongly dated. Antenatal care should begin *before the beginning*. When a woman is pregnant we can, save in a few cases, only tinker at the work of remedying defects in the casket of the coming infant. If we are in earnest for the improvement of the race, why not deal with the casket itself and the fertilizer thereof? We are illogically careful to assure ourselves of the *civil fitness* of the applicants for marriage, and inflict heavy penalties for the transgression of our laws of this fitness. But for the immeasurably more important *physical fitness* of these applicants for marriage we take not the least heed; there is not a hint to them that it should be a matter of thought. No proposal that applicants for marriage should present a medical certificate of their fitness would find favour, but it would not be unreasonable to ask these applicants for a declaration of their physical fitness even as of their civil fitness. It would probably create the demand for facilities for satisfactory medical care, and make antenatal schemes the want of the people instead of leaving them as schemes wanting people. There is nothing outrageous in the suggestion of this declaration of physical fitness; it is no more than a shifting of the strong words of the Anglican marriage service to an earlier and a better date.

* Since this was written we have received a copy of "The Memorial of the Incorporated Midwives' Institute and its Affiliated Associations, representing Practising Midwives in all parts of England and Wales." In this document all the points here referred to are elaborated and emphasized. The memorial has been sent to the Local Government Board.

British Medical Journal.

SATURDAY, FEBRUARY 19th, 1916.

WOMEN MUNITION WORKERS.

The Health of Munition Workers Committee has issued two more memorandums—the one on the employment of women[1] and the other on hours of work.[2] Of these, the former is the more interesting, partly because the subject is more novel. It is well conceived and well written. It is, indeed, a relief to come across an official publication which moves easily and directly, if not always quite succinctly, towards its purpose. There are no parentheses and no lists of things "that may be thought of in this connexion"; it is a piece of humane writing, which frankly tells the reader what the writer or writers wish him to understand. It deals with five matters concerning the health and industrial output of the women workers. Of these far the most important is that treating of periods of employment, for the section on arrangements for rest and meals is really only a subdivision of the first. That the output should stand in direct relation to the health of the workers may seem a truism to medical readers, but by health the Committee means something more than freedom from disease. It means that absence of weariness which makes labour pleasure. There ought and can be in the labour of munition workers all the three great sources of pleasure in work—physical exertion short of weariness, interest in doing well work which it is not quite easy to do well, and the inspiration of a great cause.

The employment of women in factories at night was prohibited for the textile trades by the factory legislation of 1844. It disappeared gradually in Great Britain and also in other countries, and was banished altogether by international agreement from the twelve European countries which signed the Convention of Berne in 1906. This international decision was reached after full examination of reports showing that night work caused deterioration in health due to the difficulty of securing sufficient rest by day, disturbance of home life with its injurious effect upon the children, and diminished value of the work. Though experience has shown that night work is inferior to day work, the necessities of the war have revived the night employment of women in factories, and it is the object of the memorandum to indicate how its evil effects may as far as possible be obviated. As long hours, particularly when worked during the night, appear to be the chief factors in fatigue, it is recommended that in the interests of output and health alike there should be suitable pauses for rest during the working period and adequate cessation from work at each week end, in addition to periodic holidays. The Committee does not go so far as to advise against night work for women in the present emergency, but it insists that the employment of women at night calls for great care and supervision, and that adequate pauses for rest and meals are indispensable. The greater fatigue produced at night is considered to be due partly to the fact that the hours between 3 and 7 a.m. coincide with the period when, apart from industrial fatigue, vitality is low, and partly to the fact that night workers lack the stimulus of a satisfactory meal, for they appear to have little appetite for a meal which is to be taken between 1 and 3 a.m.

There are two main systems of arranging the hours of labour: under the one there are two shifts of twelve hours, and in the other three shifts of eight hours, but there is also a third, and from every point of view most pernicious system, that of overtime, where one shift is worked from thirteen to fourteen hours. It results in undue fatigue, illness, and bad time-keeping. From the report of the mission appointed by the Director-General of Recruiting for munitions work on the output of munitions in France, it may be gathered that in that country, where the results have been extraordinarily good, the two-shift system is general, but there is a long break, averaging one hour and a half, at noon, which, it is stated, enables the women to look after the meals and comfort of their children at home. Owing to difficulties of transit and housing the plan does not work well in this country; the only houses workers can obtain are often at a considerable distance, and the trains and tramcars are overcrowded. The Committee has no hesitation in recommending that the three-shift system without overtime should be adopted wherever a sufficient supply of labour is available, that for women and girls a portion of Saturday and the whole of Sunday should be reserved for rest, and that the periodic factory holidays should not be omitted. Apart from general considerations which would lead to the conclusion in favour of the week-end rest, it has been found as a matter of experiment to be of so much importance in maintaining health and vigour that it has been reinstated by employers who had taken it for work at the beginning of the war.

A difficulty not easily surmounted is the arrangement of the changes of shifts—the change, for example, from day to night, or vice versa. It does not seem to have been as yet satisfactorily overcome. In the memorandum on hours of work, which applies to both sexes, the Committee expresses the opinion that on physiological grounds much is to be said for infrequent changes of shifts. In any case it is recommended that the change should be effected by dropping one or more shifts, and not by working for one and a half, and that the worker should have a time for rest before and after the change of shift. With regard to breaks during the day, it appears that work, as a rule, commences at 6 a.m., with breaks of half an hour for breakfast and an hour for dinner. At some factories, however, work begins at 7 a.m. or 8 a.m., the workers being expected to have had their breakfast before arrival. The objection to starting at the later hour is stated to be that, if the worker breakfasts before leaving home, the distance to be travelled to work may necessitate a very long period between breakfast and dinner; this objection is partly overcome in some places by allowing a tea interval, and it would seem that it might be met also, as it is in France, by an earlier midday meal. The Committee concludes that there is no real objection to the system of starting later, but there is some reason to think that the matter might have been put rather higher than this, for the experience of some factories in peace has been that the work done before breakfast is not good.

In dealing with the effect on women of lifting and carrying heavy weights, and violent physical movements in the operating of machines, the memorandum states that a simple appliance or

[1] Cd. 8185. Price 1½d.
[2] Cd. 8186. Price 1½d.

the alteration of a movement has often been found to modify an objectionable feature, even when it does not altogether remove it. Instances of this will be found in the Notes on the Employment of Women on Munitions of War, also issued by the Ministry this month. The publication is in a very unusual form for an official document, and consists largely of reproductions of photographs of women at work making shell bodies, working in the general machine shops and on air craft, and making shell fuses. It is a most striking and convincing picture-book.[1]

BLOOD STAINS.

In India the medico-legal expert is very frequently confronted with stains of blood upon garments, utensils, and objects of every kind produced as evidence against the accused in criminal cases. The Imperial Serologist at Calcutta[2] has recently recorded his results of the examination of 6,566 articles suspected to be blood-stained in 2,643 such medico-legal cases, made in a period of thirty-one months. The cases were almost entirely charges of murder, homicide, or assault in some form or other. Blood-stained articles of about 140 varieties were submitted for examination, half of them being classified under the single heading of wearing apparel; the others varied in nature from carts to nail-parings, umbrellas to toddy-tappers. Blood stains were found on over 5,000 of these articles; in many others it appeared as if blood stains originally present had been washed away so thoroughly as to leave insufficient blood for spectroscopical or microscopical recognition. In 36 cases the blood was non-mammalian; in 90 more it was mammalian but not human, but either ruminant, equine, canine, feline, or cameline, the diagnosis being made by the use of the appropriate precipitating antiserums obtained from fowls after immunization with the red blood corpuscles of the various mammals concerned. For the microscopical examination of a blood stain the author uses Vibert's solution[3] as the best of all those with which he is acquainted. For the microspectroscopical examination he employs a 10 per cent. solution of potassium cyanide and a yellow solution of ammonium sulphide, blood being recognized by the appearance of the two absorption bands characteristic of cyanhaemochromogen.

The possibility of mistaking ape's blood for human blood alleged by German writers is denied by Lieutenant-Colonel Sutherland, on the practical grounds that the simian antiserum does not give the human blood reaction within the specified time limit, and that the ape is not a domestic animal in India, and so is not immediately available when its blood is required to obscure or divert the path of avenging justice.

Numerous stories are related to show the skill which certain Indian intriguers devote to the manufacture of evidence against their personal foes and neighbours. For example, at Madura a religious feud existed between two castes, the Nadars and the Naickers. The former decided to start a riot in which one of their number should be killed, so that the murder might be attributed to the Naickers. "At the conclave held a Nadar proposed that his wife, whose conduct was not all that it should have been, should be the victim. Another suggested that his wife, who had deserted him, should be chosen. A third proposed that his mistress should be chosen, as she had no children and no relatives to avenge her death. This woman was beaten to death *after* a telegram had been dispatched from the nearest telegraph office to the district authorities to the effect that while worshipping at the temple she had been murdered by the Naickers. At the temple a sheep was slaughtered to 'prove' this. One of the accused persons was found to have blood on his loin cloth, and the stains were found to be due to human *and* sheep's blood." The accused, however, were acquitted for want of corroborative evidence. In another case "a man swore before a magistrate that he had been beaten by certain persons, and showed a wound on his head and a cloth stained with blood which, he said, had flowed from the wound, which had been caused by a blow from a *lathi*. The assistant surgeon reported that this wound had been caused by a sharp instrument and not by a *lathi*, and the cloth was found by us to be stained with non-mammalian blood alone. The man was tried for fabricating false evidence and sentenced to two years' rigorous imprisonment."

The medico-legal examination of alleged and true blood stains has given rise to an enormous literature, as may be seen in a recent volume[4] on the medico-legal importance of stains in general. Lieutenant-Colonel Sutherland's experience with blood stains of many varieties has clearly been very large. The office of Imperial Serologist at Calcutta must be anything but a sinecure, however much lightened by the interest of tracking out the hidden motives of passion or revenge animating the criminals concerned. It is apparent, too, that the medical expert in India is treated no better by the Bench than he is in this country.

[1] London: Wyman and Sons, or through any bookseller. Price 1s.
[2] Lieutenant-Colonel W. D. Sutherland, *Indian Journ. Med. Research*, Calcutta, 1915, iii, 205
[3] Mercury perchloride 0.5, sodium chloride 2.0, distilled water to 100.0.

[4] *Le diagnostic des taches en médecine légale.* By F. Dervieux and J. Leclercq. Paris: J. B. Baillière et fils. 1912.

PROFESSOR PAVLOV.

Professor Pavlov, whose death in St. Petersburg, where he had so long taught, was announced on February 12th, was not only one of the greatest physiologists of his day, but is to be numbered amongst the most distinguished men of science that Russia has produced. The work by which he first became generally known related to gastric digestion, and especially to its nervous mechanism. He showed the immense importance of the nervous element by his experiments on what he called "appetite secretion." The sight of food at once caused gastric secretion more copious and active than the actual presence of food in the stomach. The effect is produced through the vagus. In meat there are some bodies already existing which provoke secretion, and similar bodies may be produced in the other foods by the act of digestion itself, so that when once started, as by the appetite secretion, the process is kept up. He showed, on the other hand, that pancreatic secretion is little, if at all, affected by appetite, its chief excitant being the acidity of the chyle. More recently he had turned his attention to the investigation of the higher nervous functions, a subject on which he delivered an address (a translation of which was published in our columns at the time) before the last International Congress of Physiologists (Groningen, September, 1913). For twelve years he had devoted himself to the experimental study of reflex action and the prime function of the nervous system that concerned the formation of new reflexes, which, in the process of adaptation of living creatures to their surroundings, must be formed. He gave good reasons for believing that a well-developed conditional reflex has a definite cerebral localization, and incidentally threw a curious light on the physiology of sleep and hypnosis. He concluded that the experimental evidence afforded proof that the cerebrum is

the organ for the analysis of sensation and for the construction of new reflexes and new interpretations of sensations. As in the case of the stomach, his method of investigating the higher functions of the brain was new and in his hands had already yielded results of the first importance. Professor Pavlov was born in 1849.

THE ROYAL MICROSCOPICAL SOCIETY.

IN taking the chair for the first time as president of the Royal Microscopical Society on January 19th last, Mr. Heron-Allen said that the prime duty of the society was to record the progress of microscopic research and to encourage the development of microscopic technique and appliances. In pursuance of this policy, he, with the assistance of Messrs. C. F. Rousselet, A. Earland, and T. H. Court, made a communication to the meeting of the society on February 16th on the progress and development of vision and definition under the microscope. The subject was illustrated by the exhibition of a series of thirty-one microscopes from the society's collection, ranging from the primitive instrument of Leeuwenhoek (c. 1673) to Messrs. Beck's prismatic binocular. The compound (uncorrected) microscopes ranged from that of Culpeper (c. 1710) to Jones's "most improved" (1798); the achromatic instruments commencing with that of Dellebarre (1777). Under twenty-two of the instruments (all those for which the society possesses contemporary objectives) the foraminifer *Polystomella striato-punctata* (Fichtel and Moll), the first protozoon ever figured (by Hooke in 1665 and by Leeuwenhoek in 1702), was exhibited, mounted in the manner adapted to, and contemporary with, the instruments. A series of early books illustrating magnified objects was also exhibited, ranging from Gesner (1565) and Hoefnagel (1592) to the middle of the eighteenth century. The definition of the early microscopes of Leeuwenhoek (1673), Wilson (1702), and Joblot (1716) is poor, but the object is easily identifiable. The double (or compound) microscopes (1710–98) maintain a more or less dead level of slightly improved definition, especially when a back lens is present, but there is always a good deal of colour in the image. The reflecting microscopes of Amici and Cuthbert (1827) did away with this defect to a notable extent; the instrument of Dellebarre (c. 1777) in the society's collection is not in working order, and was, therefore, not available for comparison. The great improvement, leading gradually to the perfection attained in the present day, became first apparent in the achromatic instruments of Charles Chevalier (1820–30). The main object of giving this demonstration was to promote the issue by the society of a comprehensive history of the microscope from the earliest times to the present, illustrated by the instruments in the possession of the society and in private collections. The development of the microscope, and especially of its accuracy and definition, has played a large part in the advance of scientific medicine during the last century, and an accurate microscope is an indispensable part of the outfit of a bacteriologist. Mr. Heron-Allen in his presidential address said, on the authority of Professor Herdman, that Edward Forbes, the father of oceanography, was indirectly instrumental in introducing the study of histology and microscopic structure into medicine, because Professor Hughes Bennett, to whom he assigned this honour, had been a fellow student of Forbes (1841). Without for a moment seeking to take one leaf from Hughes Bennett's laurels, we yet venture to hesitate a doubt whether he is entitled to all the credit in this respect. It is true that Bennett, during his studies in Paris, acquired skill in the application of the microscope to medicine, and that soon after his return to Edinburgh in 1841 he commenced lecturing on histology, and gave a series of microscopical demonstrations in physiology and pathology and the diagnosis of disease, and also held classes for microscopical demonstration. But we believe that before 1841 William Sharpey had already begun to give microscopical demonstrations in London; he had been appointed professor of anatomy and physiology in the University of London in 1836, and had begun to lecture upon physiology and minute anatomy. He was the possessor of what was for that day a very good microscope, and he used to give evening demonstrations. The microscope was mounted on a round table attached to a long arm pivoted at the centre; it travelled on a broad brass band let into the table. This table existed a few years ago at University College, and may probably still be seen there. Sharpey arranged a specimen under the microscope and passed the instrument to his next neighbour, and so it went the round of the table until it came back to the demonstrator, who then adjusted another specimen. Sharpey published his paper on ciliary motion in 1830 while still a teacher in the extramurai school in Edinburgh.

THE ITALIAN MEDICAL SERVICE.

IN a recent debate in the Italian Senate Professor Pio Foà of Turin said that at first, in the hurry of mobilization, not a few officers of the medical service of the Italian army had been assigned to posts for which they were not specially fitted. Now, he said, this had been in large measure remedied. Very large demands had been made at the beginning of the war on the younger men, who were all sent to the front, where they had been ever since, and he asked that arrangements should be made for their relief from time to time. He said that already thirty-four medical officers and eight students had been killed and a large number wounded. This was due to their appreciation of the importance of giving first aid to the wounded with the least possible delay. The savagery of an enemy who fired on ambulances, stretcher bearers, and medical officers must also be taken into account. Yet in Italy the army doctor was not regarded as a combatant, and for him there was no hope of promotion for military merit. There was also the question of rank. Every doctor called up for active service had to begin with the rank of lieutenant, though the Minister for War had yielded to a demand that teachers should rank as captains; still it not infrequently happened that university professors had their own former assistants put over their heads with the rank of major. Again, a large number who had been declared unfit when exemption was comparatively easy to obtain and were not afterwards called up for further examination were given comfortable billets at home. Foà next dealt with the proposal to establish a university at San Giorgio di Nogaro where accelerated courses were to be given to students of the fifth and sixth years who should be specially examined at the end of the course by their teachers. These courses might serve if it was decided to create medical sub-lieutenants for military service, but he did not see how certain special subjects such as midwifery and gynaecology could be taught in the field. The Minister for War, Signor Zuppelli, said in reply that he had always held that the medical service was one of the most important factors in bringing the war to a successful end. He knew well that the medical officer insisted on being at the post of honour beside the soldier. The complaint as to want of promotion for war merit was, he asserted, unfounded. The project for a so-called field university was designed not to enable students of the fifth and sixth years to obtain a degree, but to pass certain special examinations. The ultimate fate of the proposal must depend on the judgement of the superior council of public instruction and the cabinet. The idea was to establish a course in some suitable place near the front where a moderate number of students could be assembled; the material available there would be much more abundant than was to be found in any university.

RAT-BITE FEVER.

RAT BITE fever is a specific infectious disorder of rare occurrence following on the bite of a rat. It has been observed in Europe, Asia, and America, but it is commoner in Japan than elsewhere, being called "sokodu" in that country. It has been caused, also, by the bite of a ferret and of a South African squirrel. It was first brought into general notice by Miyake in 1899, when he reported eleven cases of his own; it appears that fifty-three cases were reported in 1915, with a single autopsy. In 1914 the bacterial cause of rat-bite fever was isolated for the first time, and named the *Streptothrix muris ratti* by its discoverer, Schottmüller. Quite recently Dr. F. G. Blake, of Boston, has described[1] a case, ending fatally, from which he isolated the organism described by Schottmüller. The disease is rarely fatal; not so, however, in Dr. Blake's case. The patient, a healthy woman of 67, was bitten on the tip of the right index finger while taking a rat out of a trap. The wound was not severe, and was washed in hydrogen peroxide solution. Two days later signs of lymphangitis appeared in the arm; the wound was opened and dressed, and in four days the inflammation and pain had entirely subsided. A fortnight later she had a severe rigor and was sent to hospital, where she sank and died in sixteen days. A blotchy macular and maculo-papular rash appeared on the limbs and thorax, as is common in this disease; a moderate leucocytosis was present, with irregular fever. The blood gave a pure culture of the streptothrix mentioned above, and Dr. Blake gives details of its cultural characteristics and several photomicrographs of its growth. The organism was only feebly pathogenic for rabbits and white rats, and not pathogenic for guinea-pigs. At the necropsy the streptothrix was again recovered from the blood; it had caused an acute ulcerative endocarditis of the mitral valve, with perforation; infarcts were found in the spleen and kidney, with local subacute inflammatory lesions in the myocardium and the abdominal viscera that appeared free from streptotriches, and were presumably toxic. The patient's serum developed a high power of agglutinating the streptothrix. As Dr. Blake points out, the mortality of the disease is about 10 per cent., though it often incapacitates the patient for a considerable time; death may occur early from profound toxaemia, or later from the development of severe nephritis. The organism is described as slender and filamentous, forming a mycelium, and, later, chains of cocci, bacilli, or rods, spindles, and clubs may appear. It stains readily, and is Gram-negative and a facultative anaërobe.

[1] *Journ. Exper. Med.*, New York, 1916, xxiii, 39.

SLEEPING SICKNESS IN PRINCIPE.

SLEEPING SICKNESS is known to have been on the increase among the native population of the West Coast of Africa for at least a hundred and sixty years. The islands of Principe and San Thomé—lying off the Bight of Biafra, colonized mainly from the Gaboon and the Congo, for many years used as an entrepôt for slaves destined for Brazil—both of them Portuguese colonies devoted to the growing of cocoa, have suffered very severely from sleeping sickness during the last forty years. Since 1890 the disease has been an insuperable obstacle to the progress of agriculture in Principe. In this island the average annual death-rate from sleeping sickness between 1902 and 1913 was 5.6 per cent., the total death-rate averaging 15.5 per cent., and being over 22 per cent. in the worst years. About a quarter of the total population was found to be infected with the trypanosomes of sleeping sickness in 1907–11. Medical science meanwhile was not inactive; from 1907 onwards about £1,000 a year was spent on atoxyl—annually some 75,000 injections of 10 grains each were given—as a first endeavour to check the ravages of the disease. A full and interesting account of the physical and geological characters of the two islands, their flora, fauna, and climate, the great advances that have recently been made in their sanitation, and the further steps taken to stamp out sleeping sickness in them, has recently been published in a Portuguese medical periodical by da Costa, Sant' Anna, dos Santos, and Alvares (*Archivos de Hygiene e Pathologia Exoticas*, vol. v, March 30th, 1915). Lieutenant-Colonel J. A. Wyllie, F.R.G.S., has provided an English translation.[1] One of the first steps was to lessen the area of breeding ground for the tsetse fly, *Glossina palpalis*, the chief of the blood-sucking flies that infect man with the trypanosome of sleeping sickness. Another step was to exterminate the trypanosome carriers among the wild animals inhabiting the island. In 1911 the campaign was reinforced by various legislative enactments. An official sanitary brigade was organized, and was able during the next few years to carry out its duties with greater or less degrees of success; jungles were felled, extensive works for the drainage of swamps were undertaken; sentence of death was passed on all pigs, dogs, and civet cats in the island, and we read that while some 2,000 pigs perished unofficially, the official brigade accounted for 2,500 more, leaving no more than 20 survivors in August, 1914. Over 2,000 dogs were killed by gun or hatchet, and over 2,000 civet cats. It is noted that there is no reason, at present, for supposing either that *Glossina palpalis* ever feeds on the blood of the civet cat, or that the animal is ever a carrier of trypanosomes; none the less the order, "Off with its head," was carried out. Many monkeys have been killed, chiefly on account of the damage they do in the plantations; they do not seem to form part of the routine diet of *Glossina*. From 1907 onwards great efforts to destroy *Glossina* have been made, largely by the method of making the plantation workers wear on their backs dark-coloured cloths smeared with viscous preparations, to which the flies stick when they alight. In 1911 and 1912 over 400,000 *Glossinas* were killed in this way; in 1914 the fly was almost extinct in the island. As a further precautionary step, the blood of all the domestic animals in Principe was thrice examined for trypanosomes. Experiments showed that it was practically impossible to sterilize the infected horses, mules, donkeys, or oxen by repeated injections of 30 grams of atoxyl; hence all the infected animals were slaughtered. Great care was taken to detect all the trypanosome carriers among the inhabitants of the island, to isolate them, and to treat them with atoxyl in the form of double injections of 10 grains at forty-eight hour intervals every ten or fifteen days, for a period of at least four months, until repeated negative examinations of the blood for trypanosomes had been made. The cost of this campaign between 1911 and the middle of 1914 was over £30,000. Its results are described in detail, and appear to have been most satisfactory; naturally, as is pointed out, a number of stringent sanitary and other regulations will have to be maintained if the island is to be kept free of sleeping sickness. Descriptions are given of the forms of the trypanosomes found in Principe, the haematophagous insects found there, the intestinal flagellates of the *Glossina*, and the trypanosomes of the tabanid flies. The Portuguese Medical Mission that has been so successful in its efforts to suppress sleeping sickness and to improve the general hygiene of Principe is to be congratulated upon the thoroughness with which it has carried out its work. The colonial system of Portugal has not infrequently been made the object of severe strictures in England: one may doubt whether any country could show a better record of a campaign waged against a relentless disease than is to be found here.

[1] Baillière, Tindall, and Cox. 1916. (Roy. 8vo, pp. 273; 3 maps, 7 plates, 68 figures. 7s. 6d. net.)

WASSERMANN'S REACTION IN CHRONIC DISEASES OF THE LIVER.

It has long been recognized that a positive Wassermann's reaction may be yielded by the serum of a patient who has not had syphilis, but is suffering from such diseases as scarlet fever, leprosy, pellagra, yaws, and a few others. Drs. C. Verdozzi and L. Urbani[1] extend this list by the inclusion of certain chronic disorders of the liver. After giving a full account of their technique, which is precisely that described by Wassermann himself, they give a tabular and also a detailed account of 26 patients with chronic hepatic affections in whom no history or signs of syphilitic infection could be obtained. An account is also given of 27 control cases, patients with either some acute disease of the liver or bile ducts, or with acute or chronic disease of some other organ, but free from any suspicion of syphilis. Not one of the 27 controls gave a positive Wassermann reaction. But a positive reaction was obtained in no fewer than 20 of the 26 patients with chronic hepatic disease. Nine of the 26 were suffering from primary or secondary new growths of the liver, and 8 of these gave a positive reaction; in 7 the reaction was complete. The remaining 17 had one or another form of cirrhosis of the liver, and Wassermann's reaction gave a positive result in 9 of these, while in 3 more there was fixation of the complement even in the absence of antigen. The authors remark that Boas failed to find a single positive reaction in 59 cachectic patients with malignant disease; possibly, they suppose, because the liver was little involved in these cases. The authors state that jaundice is not in itself a cause of a positive Wassermann reaction; jaundice was present in 13 of their 26 patients, and 6 of the 13 gave a negative reaction, as was also the case with all the 6 patients in the control series who were jaundiced. They note that the reaction was more often incomplete in hepatic cirrhosis than in the cases of hepatic neoplasm.

[1] *Il Policlinico*, Rome, 1915, sez. med., xxii, 529.

RESTRICTIONS ON THE SALE OF LAUDANUM.

The recent action of the Council of the Pharmaceutical Society, in adding to Part I of the Poisons Schedule all preparations of opium containing 0.75 per cent. or more of morphine, puts an end to a somewhat anomalous state of things which has existed for the last thirteen months. Until the *British Pharmacopoeia* of 1914 came into force on January 1st, 1915, laudanum, or tincture of opium, contained 0.75 per cent. of morphine, and was therefore included in Part II of the Poisons Schedule, and could be sold by any qualified pharmacist without restriction, provided it was labelled with its name, the word "Poison," and the name and address of the seller; only preparations containing 1 per cent. or more of morphine were in Part I, so that they could not be sold unless the purchaser was personally known to the seller or was introduced by some one known to both, and after making an entry, in a book kept for the purpose, of the particulars of the sale, the purpose for which it was required, etc., which entry had to be signed by the purchaser. In the *British Pharmacopoeia* of 1914, however, the strength of the official tincture of opium was raised to 1 per cent. of morphine, while the synonym "laudanum" was retained, and the tincture therefore passed automatically into Part I of the schedule. This placed pharmacists in a somewhat difficult position; if called on *de novo* to dispense or supply tincture of opium or laudanum, the new tincture alone could be supplied and the regulations of Part I must be complied with, but in dispensing prescriptions written when the old *Pharmacopoeia* was in force, obviously the tincture of the old strength must be used, and in selling laudanum to persons who had previously been accustomed to buying it, it would have been dangerous to supply an article one-third stronger than formerly, even though the requirements of Part I as to signing the Poison Book were complied with. In order to prevent divergence in the methods adopted by different pharmacists in dealing with this situation, the Council of the Pharmaceutical Society passed a resolution recommending that "when laudanum is asked for the 1914 preparation should be supplied, and the Poison Book signed; but when the 1898 preparation is demanded, care should be taken to label it accordingly, and the attention of the purchaser should be called to the fact that it is the 1898 preparation." The Privy Council submitted this resolution to the General Medical Council, and the latter body expressed the opinion that the limit of strength for preparations of opium which can be sold without the Poison Book being signed should be 0.75 and not 1 per cent. This recommendation was duly passed to the Council of the Pharmaceutical Society, as the body charged by law with the duty of amending the Poisons Schedules, and has now been acted upon by it. The present position, therefore, is that any one purchasing "laudanum" without indicating the preparation of the 1898 *Pharmacopoeia* will receive the 1 per cent. tincture, while those accustomed to the older and weaker preparation can obtain it by asking for the 1898 tincture, but in both cases the Poison Book must be signed and the full requirements of Part I complied with. It is certainly desirable that the sale of so dangerous a substance as laudanum should be hedged round with all the restrictions required by the law, and the inclusion of both tinctures in Part I will remove the possibility of obtaining it without complying with these restrictions by demanding the tincture formerly official.

INFECTIOUS DISEASES IN SCHOOLS.

The common specific infectious fevers, particularly, perhaps, diphtheria, have been the bugbear of the masters and mistresses of schools and colleges for many decades. Small educational establishments have been ruined before now by the occurrence of a fatal case of diphtheria among their boarder pupils, although it may have been obvious that the authority responsible for the health of the pupils was in no way to blame for the catastrophe. Nowadays both parents and public opinion are apt to be so well informed, not to say censorious, in the matter of the spread of infectious fevers among school children, that it is of the utmost practical importance to the medical men, headmasters, and matrons who may be in charge of them that there should be some standard authority to lay down the rules and regulations whereby this spread may best be prevented. This authority is furnished in the excellent *Code of Rules*[1] issued by the Medical Officers of Schools Association. The first edition appeared in 1885; the latest and seventh edition was issued a few months ago. Beginning with a list of the periods of quarantine and of the isolation of the infected, the *Code* gives brief but thorough directions for the general hygiene of schools and their sanatoriums, the precautions that should be taken to avoid the entry or return of pupils who may be infectious, and the steps that must be taken to prevent the spread of such fevers as diphtheria, measles, scarlatina, and the like when they have broken out in schools. Enteric fever, cerebro-spinal meningitis, and poliomyelitis are not included in the *Code;* three appendices contain forms of certificates that may prove useful, the law as regards notification, and practical directions for disinfection. The *Code* is briefly and clearly written. It should be in the hands of all medical men and trained nurses who have to do with children with the specific exanthems, and it may be cordially recommended to the attention of the ever-widening circle of schoolmasters, school managers, and parents who are so directly interested in minimizing the incidence and harmful effects of the acute specific fevers.

[1] *A Code of Rules for the Prevention of Infectious Diseases in Schools.* Issued by the Medical Officers of Schools Association. Seventh edition. London: J. and A. Churchill. 1915. (Demy 8vo, pp. 66. 1s. net.)

GUNSHOT FRACTURES OF THE JAWS.

THE treatment of gunshot fractures of the jaws is at the present time attracting a good deal of attention. It is both difficult and important. Part of the difficulty arises from the fact that the parts are almost always infected, and it is practically impossible to free them from infection. Another difficulty, in the case of the lower jaw, is that of safely bringing the fragments into proper position and maintaining them for a sufficient length of time. Unless this can be done union will almost certainly take place in a faulty position, and the use of the jaw in speech and mastication will be seriously interfered with. The distressing nature of the deformities that may be produced, particularly perhaps when the fracture involves the upper jaw, is another reason which makes these injuries worthy of study. We are glad, therefore, to be able to publish this week a set of papers on the subject, in which general and dental surgeons have acted together, with great advantage to their patients. A discussion on war injuries of the jaws is to take place at a meeting of the Section of Odontology of the Royal Society of Medicine on Monday, February 28th, and an exhibition of dental splints, models, radiograms, photographs, and apparatus illustrating the subject, will be open from Tuesday next, February 22nd, to Monday, February 28th (from 11 a.m. to 5.30 p.m. each day). Any member of the profession who can contribute is invited to communicate with the honorary secretary of the Section, 1, Wimpole Street, W.

THE news of the death of Sir William Turner, principal and vice-chancellor of the University of Edinburgh, will be received with a sense of personal loss by thousands of friends and old pupils in every part of the British empire He was in his 85th year, but had been attending to his university work with his usual alertness and acuteness of mind until about a week ago; he then began to suffer from gastric trouble by which his strength was rapidly exhausted. We hope to publish a biographical notice in an early issue.

A MEMORIAL to Florence Nightingale in the crypt of St. Paul's Cathedral was unveiled by the Queen on February 14th. It is placed on the wall of the archway that leads from the tomb of Nelson to that of Wellington. The Archbishop of Canterbury, in addressing Her Majesty, said that the success of Florence Nightingale was due to the fact that to a buoyant faith, a courageous hope, and a large love were added penetrating judgement, potent personal influence, and almost unrivalled administrative skill. The memorial, which is of white marble, showing a half-length portrait, is the work of Mr. Walker, the sculptor of the statue unveiled last year in Waterloo Place.

THE annual meeting of the Royal Medical Benevolent Fund Guild will be held at the London Mansion House on Monday next, at 3.30 p.m., under the chairmanship of the Lord Mayor. The Guild supplements the assistance given by the grants of the Royal Medical Benevolent Fund by personal services, by gifts of clothing, and in other ways. The number of cases with which it is asked to deal is increasing, and the Guild appeals to the public as well as to the medical profession for support. Subscriptions may be sent to the treasurer, Mrs. Scharlieb, M.D., 149, Harley Street, W.

THE Gynaecological and Obstetrical Societies of Latin and German Switzerland have decided to hold a combined meeting once a year under the name of the Société Suisse de Gynécologie. It will be held alternately in Latin and in German Switzerland. The first meeting is fixed for September next, and will be held at Lausanne under the presidency of Dr. Henneberg, President of the Latin Society.

THE WAR.

WOUNDS OF THE HEAD AND BRAIN.

DR. W. v. BRUNN[1] states that he enjoyed exceptional facilities for studying wounds of the head, as the field hospital which he commanded was barely 3 kilometres behind the front, and he was able to keep his patients there as long as he wished. Even after they were drafted elsewhere, he was able in practically every case to keep in touch with them, and to learn the late effects of his treatment. Altogether he deals with 297 cases of wounds by projectiles. The face was wounded in 104 cases; 4 of these patients died early owing to extensive shattering of the bones and laceration of the soft tissues. Among the 193 cases of wounds of the head in which the face escaped, there were 74 cases in which the bones of the skull were injured. Among these, again, the brain escaped direct injury in 6.

WOUNDS OF THE BRAIN.

Of the 68 patients whose wounds extended to the brain, 42 died and 24 recovered; the fate of the remaining 2 was unknown, as they had to be transferred elsewhere within the first week. Among the fatal cases were 17 patients whose condition was too hopeless for any operation, and who died in a few hours. Two other patients wounded early in the war died on the fifth and eighth days respectively, no operation having been performed. Twelve patients admitted to hospital in a desperate condition were operated on, and died within a day. Eleven patients were operated on, and died after six to fifteen days, death being due to encephalitis in 5 cases and meningitis in 6. Among the 24 patients who recovered were 8 who had been wounded by bullets passing through the skull (*Durchschüsse*), and who were not operated on. The remaining 16 patients, who recovered, were operated on (trephined). Altogether Dr. v. Brunn saw 17 cases of wounds of the skull in which the bullet had escaped (*Durchschüsse*), and among them 7 died and 10 recovered. Among the 11 wounds of the skull in which the bullet remained in the body (*Steckschüsse*), there were 8 deaths and 3 recoveries. There were also 40 cases of tangential wounds of the skull, with 27 deaths, 11 recoveries, and 2 cases whose fate was unknown. The high proportion of cases admitted moribund to hospital was explained by the brevity of the interval between the infliction of the wound and the admission of the patient to hospital. This class of case was not seen by surgeons only a few kilometres further from the front, and thus it was that these surgeons were apt to be misled as to the prognosis of bullet wounds of the brain.

TREATMENT OF WOUNDS OF THE SKULL.

Treatment of wounds of the skull was instituted as early as possible, but only in two cases was it necessary to operate when the bullet had passed in and out of the skull. Both these patients recovered in spite of shattering of the bone and prolapse of the brain. Operations were frequently undertaken when the bullet remained in the skull, but when it was not found at once no extensive search was made for it, for fear of injuring the brain and exciting encephalitis. Necropsies performed in such cases almost invariably showed that the projectile could not have been removed without serious injury to the brain. Dr. v. Brunn had learnt to defer extensive operative measures for this class of case till weeks had elapsed, when the external wound had healed and facilities were available for operating under aseptic conditions and *x*-ray control. On the other hand, tangential wounds of the skull were operated on in practically every case, and whenever there was the slightest suspicion of brain injury. At these operations the borders of the wound were cleaned and partially excised, the margins of the bones were trimmed, and loose fragments, some of considerable size, were extracted from the brain or from the space between the skull and the brain. In two cases in which recovery ultimately occurred pieces of the skull, almost as large as the palm of the hand, were removed. When the loose fragments of bone had been removed, loose sterile mull was lightly applied to the wound. The wound

[1] *Deut. med. Woch.*, November 11th, 1915.

was kept open, the greatest care being taken to avoid compression of the brain by sutures or primary plastic coverings. During the first weeks of convalescence every effort was concentrated on the avoidance of infection; and, apart from stringent asepsis, the most important measure was the avoidance of every mechanical irritation, notably pressure on the brain. Irritation thus produced almost invariably provoked more or less severe oedema.

Prolapse of the Brain a Reassuring Sign.

Dr. v. Brunn repeatedly observed that those patients did well in whom prolapse of the brain developed early and continued some time. He also noticed that what he called the pedicle of the prolapse became united to the surrounding margin of the skull by a fine adhesive membrane, which formed a barrier between the interior of the skull and the surface of the prolapsed brain, often septic and necrotic. When the necrotic layer of the prolapse sloughed off, the brain sank again, but did not retract completely within the limits of the skull, as it had become secured to the margins of the skull and dura. The surface of the brain thus left exposed was first covered by a delicate, rose-coloured layer of granulation tissue, which ultimately gave place to epithelium growing from the margins of the wound. Even when the prolapsed portion of brain was larger than a fist it finally shrank to small proportions, retracting automatically as the wound healed. Dr. v. Brunn took care not to exert any pressure on the prolapse, as the assumption that it needed pressing back into the cavity of the skull was incorrect. It was, however, necessary to protect the brain by a plate or a plastic operation at a later stage when the wound had completely healed.

The Symptoms of Encephalitis and Meningitis.

When, after the first two or three days, the brain showed no further tendency to prolapse, and began instead to sink back into the interior of the skull and to become discoloured, encephalitis had supervened; and the patient, who had gradually been losing consciousness, snuffed out like a light. For this condition there was no remedy. If meningitis occurred, the temperature began to rise before other serious symptoms developed. This warning was an indication for lumbar puncture, which yielded cloudy fluid under high pressure. When this was the case, lumbar puncture should be repeated daily and sometimes even twice a day, if the patient's condition became alarming and the fever increased. Though Dr. v. Brunn had lost many patients in spite of this procedure, it had saved the lives of many others, even after they had developed all the classical signs of meningitis. In all his cases he gave urotropin, and he was prodigal in the use of hydrogen peroxide, which he applied to the whole of the wound. In a most desperate case, in which the lateral ventricle had been perforated, he instilled hydrogen peroxide daily. In spite of a bedsore as large as two hands, the patient, though soporose for days, ultimately recovered, but left hemiplegia remained. Though opposed on principle in other fields of surgery to frequent changes of dressings, Dr. v. Brunn had soon learnt that wounds of the brain required daily changes of dressings—at any rate, for the first weeks. In many cases more or less extensive areas of hyperaesthesia were found associated with injuries to the head. The most varied paralyses were also observed; but Dr. v. Brunn threw no new light on the relations between these conditions and the particular brain lesion by which they had been provoked.

CASUALTIES IN THE MEDICAL SERVICES.

Army.

Died on Service.

Lieutenant-Colonel Hew Ramsay Duff, of the Canadian Army Medical Corps, was reported to have died in France in the casualty list published on February 11th. He was born at Kingston, Ontario, in September, 1857, the son of the late Lieutenant-Colonel John Duff, police magistrate of that city, and was educated at Kingston grammar school and at Queen's University, Toronto, where he took the degree of M.D. in 1884. He had been connected with the Canadian Army Medical Service throughout his career, was President of the Army Medical Corps Board of Survey for Ottawa and district, acted as medical officer of the Quebec tercentenary celebrations in 1908, served in the South African war with the Canadian contingent from 1899 to 1901, gaining the Queen's medal with four clasps, and held the Canadian long service decoration. He attained the rank of lieutenant-colonel on July 27th, 1904.

Miss W. S. Coates, V.A.D., serving with the British Red Cross, is reported in the casualty list published on February 12th as having died on service in the Mediterranean.

Killed in Action.

Captain George Seymour Stritch, 6th Service Battalion, Connaught Rangers, was killed in France on February 7th. He was born in Dublin in 1878, the son of the late George Seymour Stritch, K.C., educated at Trinity College, Dublin, and in the schools of the Royal Colleges of Surgeons of Dublin and Edinburgh, and took the Scottish triple qualification in 1895, also the L.A.H. Dublin in 1902, and the L.M., with a special certificate in gynaecology, at the Rotunda Hospital in 1904. After qualifying, he filled the posts of assistant medical officer of the Argyll and Bute Asylum, and resident medical officer of the Lock Hospital, Dublin. He subsequently settled in practice in Dublin, where he was anaesthetist to the Incorporated Dental Hospital, Ireland, and honorary surgeon to the Actors' Association, Actors' Union, and Music Hall Artistes' Association. He had also been examiner in midwifery, gynaecology, medical jurisprudence, and materia medica to the Apothecaries' Hall, Ireland, had written several papers on venereal disease, and was the inventor of a prolapse pessary. He had served as a Captain in the Volunteers, and when the war began received a commission in the 15th Battalion Durham Light Infantry, from September 23rd, 1914, being subsequently transferred to the Connaught Rangers. He was a prominent Freemason, and a cousin of Sir Edward Carson. In 1910 he married Lilian, daughter of Canon Ford, and leaves two children.

Wounded.

Captain A. R. S. Alexander, I.M.S., Mesopotamia.
Captain N. R. Rawson, R.A.M.C. (temporary), France.
Captain H. Dunkerley, R.A.M.C. (temporary), France.
Lieutenant E. Doherty, R.A.M.C. (temporary), France.
Lieutenant N. A. Scott, R.A.M.C. (temporary), France.

Deaths among Sons of Medical Men.

Holmes, Philip Lawton, of the King's Royal Rifles, killed on the Western front on November 25th, 1915, was the second son of Dr. James Holmes of Whitefield, Manchester.

Richardson, Thomas Charles, Captain Special Reserve, Royal Engineers, elder son of Dr. T. A. Richardson, of Clifton Park Road, Clifton, late of Combe Martin, North Devon, and formerly of Croydon, killed in France on February 5th. He got a commission as Lieutenant in the Reserve, R.E., in June, 1914, and was promoted to Captain in July, 1915. He was serving with the 185th Company, R.E., when he, with another officer, was killed by the enemy exploding a mine.

Singh, B. P. and B. M., lost in the *Persia*, on December 30th, were the sons of Lieutenant-Colonel B. J. Singh, I.M.S., Inspector-General of Prisons, Bihar and Orissa. They had been at St. Paul's School, and were returning to India.

Turton, Cecil William, Lieutenant 6th Battalion, Royal Sussex Regiment, younger son of James Turton, F.R.C.S., of Brighton, accidentally killed at Brighton on February 4th, aged 21.

Medical Students.

Marshall, John Morrice Maitland, Lieutenant 4th Essex Regiment, who died of wounds on October 23rd, 1915, was a student at St. Bartholomew's Hospital.

NOTES.

Scottish Women's Hospital.

The staff of the first and second Scottish Women's Hospital Units arrived in London on February 12th, after two months' detention as prisoners of war in Austria and Serbia. The members are:—*First Unit:* Drs. Davidson and McDougall; Miss Bowhill (matron); Sisters Fletcher, Brown, Scorgie, Skae, Mortimer, Hissey, Gibson, Pettigrew, Smith, Jones, and Lamb; Miss Madden (chauffeur), Miss Duke (*x*-ray operator), and Misses Gregory, Hare, and Lees (V.A.D.). *Second Unit:* Drs. Alice Hutchison, Laura Hope, Sybil Lewis, Agnes Proctor, and Charles Hope; Miss Jack (administrator); Miss Philp (matron); Miss Gordon (sanitary inspector); Nurses Bayne, Carter, Caton, Donovan, Dow, Duguid, Ellis, Evans, Gordon, Hall, Hamer, Hart, Kilty, Oldfield, Pinder, Richards, Saunders, Walmsley, Williams, and Wilson; Misses Nicholls, Kerr, M. Fraser, A. Fraser, and Tebbutt (orderlies).

Ireland.

IRISH WAR HOSPITAL SUPPLY DÉPÔT.

THERE are a number of War Hospital supply dépôts in Ireland, where some thousands of ladies make hospital requisites for the wounded. The provincial dépôts work in conjunction with the central dépôt in Dublin, which is affiliated with the Joint Committee of the Red Cross and St. John Ambulance Brigade. The several Irish dépôts are supported entirely by voluntary contributions and all the workers are voluntary. There is a register of over 1,000 voluntary workers at the central dépôt, and the average daily attendance for the past three weeks has exceeded 180. These ladies, working under trained instructresses, who are the most expert of the voluntary workers, make all classes of many-tailed and roller bandages and swabs, special boots for soldiers suffering from "trench feet," and pneumonia jackets. The Dublin dépôt has undertaken the making of surgical dressings for the Committee of the Dublin Salesmasters' Association, which has charge of the administration of the proceeds of the All-Ireland Farmers' sale, which was specially earmarked for dressings, etc., for men in the trenches in the fighting centres. Several bales of dressings on this account have already been sent to Salonika and Flanders. The first grant to the dépôt from this committee was £250, and a further sum of £750 has recently been handed over. By purchasing the materials in large quantities, and having the dressings made by voluntary workers, a saving of at least 25 per cent. is effected. Considerably over 12,000 articles were made at the Dublin dépôt during January. Sphagnum moss is largely used in the manufacture of swabs, and its suitability for this purpose, when properly cleaned, is now widely recognized. Last week Her Excellency Lady Wimborne, accompanied by Major-General Friend, Commander of the Forces in Ireland, visited the central dépôt in Dublin, and after an inspection of the various workrooms, expressed their keen appreciation.

Scotland.

AT the annual meeting of the Glasgow Maternity and Women's Hospital on February 10th it was stated that altogether 3,645 cases, including 1,650 indoor cases, had been treated during the year. Among them were 563 wives of soldiers and sailors. Sir George Beatson, in moving approval of the reports, said that the nation was awakened to the fact that there must be an economy in infant life. Though there were differences of opinion, he thought all were agreed that the organization for dealing with the matter must be built upon the basis of the Notification of Births Act. The Countess of Eglinton, in seconding, said that the expected result from the Insurance Act of a diminution in the mortality among mothers had not come about. This was not due to destitution, because wages were higher and separation allowances adequate. The causes appeared to be carelessness, love of pleasure, dirt, neglect, and maternal ignorance.

At the meeting of the Glasgow School Board on February 10th Dr. Grant Andrew gave a summary of the report on the medical inspection of school children for the year ending July 31st, 1915. Though there was no improvement in the number of underfed and ill-clad children as compared with the previous year, the totals were small and compared favourably with those for 1909–10. Medical treatment was given for ear, eye, teeth, and skin diseases. The proportion of children with decayed teeth was still very high; 5,487 out of 24,611 medically examined had five or more decayed teeth. There were 1,971 cases of rickets, but the percentage of children with rickets and rickety deformity admitted to schools for the physically defective showed a gradual diminution.

In his annual report Dr. G. Douglas McRae, medical superintendent of the Ayr District Asylum, stated that the admissions of men (70) were 14 under the average of the past twenty years, while those for women (71) remained practically the same. Alcoholic excess was present in 41 per cent. of the men and 22 per cent. of the women, as compared with 47 per cent. and 14 per cent. respectively last year. Little influence ascribable to conditions arising out of the war was to be observed among those admitted.

The report presented to the annual meeting of the Glasgow Royal Infirmary on February 14th stated that the capital fund had, for the second year in succession, been seriously encroached upon. The charges amounted to over £5,000 a month, and even after applying the net amount received by way of legacies, donations, etc. (£13,000), it had been necessary to withdraw over £15,000 from capital account. The managers appealed for increased financial support to the extent of at least an additional £30,000 a year. The number of patients admitted showed a slight increase—from 10,291 to 10,705; the daily average number resident was 741, against 678. The average residence of those treated to a conclusion was 25.5 days, against 23.9. During the year 150 beds had been maintained at the disposal of the naval and military authorities, and had been more or less continuously occupied, without interfering with the ordinary work of the institution. Of the members of the medical and surgical staff, 38, or practically all, hold commissions, R.A.M.C., and 12 are engaged in Red Cross hospitals.

TOLAMINE (CHLORAMINE-T).

THE importance of the contribution entitled "Studies in Antiseptics" (Dakin, Cohen and Kenyon, BRITISH MEDICAL JOURNAL, January 29th, 1916), describing the advantages of para-toluene-sodium-sulphochloramide as an antiseptic for irrigating infected wounds, etc., has been recognized by the medical profession, and Messrs. Burroughs, Wellcome and Co. have prepared compressed "soloids" of the substance in two strengths—8.75 and 87.5 grains. The title chloramine-T was suggested by the authors of the paper, but for many years a combination of other medicinal agents has been issued bearing the name chloramine. To avoid confusion, therefore, Messrs. Burroughs, Wellcome and Co. have decided to use the name "Tolamine." The statements contained in the paper by Dr. Dakin and his colleagues as to the strength in which the antiseptic has been found suitable in the conditions mentioned may be summarized as follows:

For irrigating infected wounds: 4 per cent.; gr. 8.75 two in 1 oz., or gr. 87.5 one in 5 oz. of water.
For use as a mouth wash: 1 per cent.; gr. 8.75 one in 2 oz., or gr. 87.5 one in 20 oz. of water.
For irrigating bladder and uterus in septic cases and for chronic urethral infection: 0.5 per cent.; gr. 8.75 one in 4 oz., or gr. 87.5 one in 20 oz. of water.

It will be seen by reference to p. 161 of the JOURNAL of January 29th that Dakin and his colleagues found that the germicidal action of chloramine, when tested against the ordinary organisms found in infected wounds, is about as powerful as an equal weight of sodium hypochlorite; as the molecular weight of chloramine is about four times that of sodium hypochlorite, the germicidal action of one molecule is about four times as great; as it is less irritating, it may be used safely at a concentration five to ten times as great; it is readily soluble in water and neither precipitates nor coagulates proteins such as blood serum. Its mode of action is thus summed up by its discoverers:

Chloramine represents an active antiseptic containing a store of chemically combined chlorine in a form which is quite stable and non-irritating under ordinary circumstances. But when brought in contact with proteins and similar cell constituents containing basic (NH_2) groups, it acts like a chlorinating agent, losing its chlorine to the basic substances, and thereby exerting its antiseptic action as needed. Chloramine, being a highly reactive substance, should not be mixed with other antiseptics. Both alcohol and hydrogen peroxide are decomposed by it.

The prices for the soloid preparations are unfortunately very high—72s. a dozen for the bottles containing 100 of 8.75 grains, and 54s. a dozen for tubes containing 10 of 87.5 grains. The manufacturers state that these prices are abnormal; owing to the use of chloramine bodies in the making of explosives, materials ordinarily obtained as by-products have now to be made.

MR. SAMUEL MATHER of Cleveland, Ohio, has founded a school for the graduate study of tuberculosis as a memorial to the late Dr. Edward L. Trudeau. The school will probably have its local habitation at Saranac Lake, New York, but co-operating agencies for special study will be created in New York City.

Correspondence.

THE PHYSICS OF A SURGICAL DRESSING.

SIR,—I was delighted to read Lieutenant-Colonel A. Primrose's paper on the above subject in your issue of February 12th, p. 238. For the last three weeks I have been making some simple experiments with water in a glass bottle and a wick leading out of it into a tray. Some methyl blue was placed on the wick at the neck of the bottle to show the direction of the flow. When a bell-jar was placed over the whole apparatus I found that the wick leading into the bottle became stained with the blue dye for nearly an inch, suggesting that under these conditions there was a tendency for the drainage to flow backwards.

My experiments are not yet nearly completed, but I fancy that there are three main conditions that affect the direction and the rate of flow:

1. The difference of level of the fluid in the bottle and the tray.
2. The relative dryness of the air in the bottle and over the tray.
3. The presence of salts in either the bottle or the tray—that is, the effects of osmosis.—I am, etc.,

Newcastle-upon-Tyne, Feb. 13th. A. S. PERCIVAL.

SIR,—It was with very great pleasure that I read Lieutenant-Colonel Primrose's article under the above heading. Therein he calls attention to a very widespread fallacy in the after-treatment of infected wounds, and the experiments he quotes in support of his argument place on a scientific basis what has been obvious to me clinically for many years.

Whatever bacteriologists may say on the treatment of localized suppurative infections, our most successful treatment still consists in establishing free drainage, and maintaining it until the wound has healed. If this is done, I believe it matters little whether mild antiseptic solutions, salines, or plain sterilized dressings are subsequently applied, for once the tension is relieved the part is automatically flushed with serum and its contained antibacterial substances, whatever they may be.

Fomentations as usually applied consist of a piece of lint wrung out of hot boracic solution, and covered by a piece of gutta-percha tissue or oiled silk larger than the wet dressing, so that when applied it overlaps the latter all round. By this means evaporation is reduced to a minimum, bacteria and discharges are pent up beneath this impervious material, the wound and surrounding skin are left to "stew in their own infected juices," and free drainage no longer exists. In this way the chief object of an incision into an infected area is often neutralized. It has been my endeavour for several years past to impress this fact on the students and nurses of the Birmingham Medical School, but the use of "fomentations" is so firmly established by tradition and usage that it is difficult to eradicate a custom condoned by generations of surgeons.

My attention was first drawn to this matter by the frequently disastrous results which followed the treatment of whitlows in hospital practice. In such cases, despite early incision and free drainage (the routine after-treatment of which is the application of fomentations), in a few days the skin is macerated and undermined with pus, the edges of the wound everted, oedematous and unhealthy, and in a large percentage of cases this treatment fails to prevent the spread of infection up the finger to the palm. It seemed obvious to me that, although surgically free drainage had been established, there was something interfering with the free discharge of the infected fluids, and it did not require any great amount of discernment to fix the blame on the gutta-percha tissue.

For several years I have discarded impervious materials in the after-treatment of infected wounds, using as a rule only dry sterilized dressings, but if pain is severe and requires heat for its relief, or if the discharge is so thick that it will not soak into dry dressings, I use gauze wrung out of hot saline or some mildly antiseptic solution, and covered with several layers of hot dry wool. These do not retain the heat so long as the old-fashioned fomentations, but this is an advantage, in that it is an incentive to change the dressings more frequently; once an hour is not too often for a freely discharging wound.

By these means the maceration and infection of the surrounding skin is prevented, the infection is rapidly localized, the wound takes on a healthy appearance, and free drainage, once established, is maintained.—I am, etc.,

Birmingham, Feb. 14th. BERNARD J. WARD.

SIR,—The article by Lieutenant-Colonel Primrose, in your issue of February 12th, is really too absurd, and will, I am sure, raise a storm of protest. The experiments he quotes are of no value whatsoever in support of his statements. Does he not realize that the dressing must be kept moist by an impermeable material, so that drainage is established and maintained by capillary attraction? We are not dealing with flasks of water in surgical practice, but with tissues of more or less solidity. How often have we seen the evil effects—sometimes leading to general blood poisoning and death—which result from the application of dry dressings to septic wounds. Impermeable materials are only of use in keeping the dressing moist, so that capillary attraction is not interfered with; a piece of oiled silk applied directly to a septic wound is every bit as injurious as a dry dressing. I sincerely trust that this article will not cause any practitioner to depart from the old principle of using dry dressings for aseptic surgical wounds, and moist dressings covered with some form of impermeable material for all septic injuries. Otherwise it will be bad for him, and a good deal worse for the patient.—I am, etc.,

Wigan, Feb. 13th. J. THOMSON SHIRLAW, M.D.Edin.

SIR,—Lieutenant-Colonel Primrose, in the article he contributes to the BRITISH MEDICAL JOURNAL of February 12th, comes to the following conclusion: "I am convinced it would be greatly to the advantage of the wounded if impermeable protective and oil-silk were entirely removed from the surgical armamentarium of the army." Colonel Primrose points out how impermeable tissue is commonly badly employed, just as others have found fault with the use of the probe, but it is absurd to suppress either if it be useful when properly handled.

Many men use a probe as a soldier should a bayonet! With such it is the method, not the means, which is at fault. Impermeable tissue should cover a wet dressing as a tarpaulin does a hayrick, not as it covers goods on a railway truck.

Colonel Primrose says: "In my opinion, the best dressing for septic wounds is a moist dressing, and we found the hypochlorous acid solution wonderfully effective. The moist dressing is applied directly to the wound, and over this dry gauze." Thus treated it would not remain a moist dressing for many hours, and either the wound would have to be dressed with exhausting frequency, or the dressing would be found dry and adherent when removed.

If a wound be discharging freely I cover it with a patty-pan, bent to shape, and having a large hole through its centre. All discharge can then easily escape. If a moist dressing be employed, a pad of wet wool should be put over the wet gauze to help keep it wet, and then a cap of impermeable tissue on top. If the impermeable material be scarcely larger than the dressing it covers, none of Colonel Primrose's troubles will arise, as all discharges can escape laterally. Moreover, a small piece of impermeable is economical, since less wool is required to cover it and extend the needful distance beyond.

Colonel Primrose gives evidence to show that an impermeable material over a dressing tends to urge any chemical constituent in the dressing inwards towards the skin or wound. Such an argument should encourage him to recommend it, since if the solution he prefers—that is, hypochlorous acid—be urged inwards so much the better for the wound.

In my experience a good treatment for discharging wounds is free drainage; a better is continuous irrigation; the best is baths. Dressings are chiefly put on for convenience, since a painful wound wants protecting, and so do the clothes or bed. Little can be done for a deep discharging wound beyond removing dead bone or foreign

bodies operatively, and keeping the parts clean, open, and quiet.

Most surface wounds heal excellently in practice with wet hypochlorous dressings capped, rather than covered, with waterproof tissue. There is, however, no absolute rule in medicine or surgery. I often dress the same wound in two or three different ways in a week. The more experience I have the more I disbelieve in "A" being always good and "B" being always bad, provided "C," the *chirurgien*, uses his wits.—I am, etc.,

Exeter, Feb. 12th. D. W. SAMWAYS.

TRENCH FEVER.

SIR,—Captain J. W. McNee and his colleague, Lieutenant Arnold Renshaw,[1] are greatly to be congratulated on their demonstration that the causal organism of this disease is transmissible from man to man by blood injections. Their demonstration of this fact is indeed the fundamental basis for all future work on trench fever, especially for immunizing experiments, affording as it does an invaluable control, which is, unhappily, still wanting in many systemic infections of obscure etiology. The majority of the other conclusions drawn from their published experiments—such as that trench fever is a disease *sui generis*, that it is not transmissible by injections of moderate volumes of serum, and that the virus is mainly intracorpuscular—appear to be well founded, and to be capable of ready confirmation.

The conclusion, however, that failure to prove infectivity of filtrates of saline extracts of crushed blood corpuscles is good evidence that the virus of trench fever is not filterable, and is therefore presumably of considerable size (though this is only inferred), is on a somewhat different footing, and for this reason. If it is desired to test the filterability of a virus, and hence to get some idea of size relatively to the vanishing point of vision, one condition must in some diseases be observed, even when working with the unsatisfactory Berkefeld filters, before it is possible to come to a final conclusion; and this condition is that the organism it is desired to test must be as far as possible isolated from the albuminous medium in which it occurs before filtration is attempted. And this applies equally to plasma, serum, haemoglobin-stained fluid, and to saline extracts of crushed blood corpuscles. If this isolation be not carried out it is often impossible to prevent blocking of the filter with colloidal albumen, which may be, and often is, fatal to the passage of certain types of small organisms. And this blocking is not necessarily prevented by mere dilution, even up to the limits of practical experiment. In my own work, for example, it has often happened to me—particularly in typhus fever, cerebro-spinal fever, and scarlet fever—to find that attempts to prove the infectivity of filtrates of the blood, serum, plasma, or other albuminous fluid may fail by using the classical technique recommended in the textbooks. And this even when working with high dilutions. If, however, the fluid suspected of harbouring a minute virus be well centrifuged, and if the whole of the albuminous medium—as far as is practicable—be replaced by saline the filtrate will now often prove to be infective, when before it proved to be non-infective. In the case of corpuscles suspected of harbouring a virus, freshly distilled sterile water will often give a far better extract for purposes of filtration than will crushing followed by treatment with saline, the tinted supernatant fluid, after centrifuging, being in the first case finally replaced by saline.

If therefore experiment fails to reveal the presence of a virus in a filtrate when the ordinary methods are adopted, some such method of isolation as that referred to should be given a trial before concluding that the virus is not filterable. The fact that no organisms could be seen in blood films rather suggests the presence in trench fever of a minute virus which may require special treatment before it can be proved to be filterable or the reverse. And it is well to remember that minute organisms are often more difficult to see in an albuminous than in a non-albuminous matrix.

If Captain McNee and Lieutenant Renshaw will accept the suggestion, they may perhaps find it worth while to repeat their filtration experiments on these lines. And if in addition they care to incubate the filtrate, after enrichment with sterile ascitic fluid or with serum-broth, interesting cultural results may be obtained which are often unattainable when the ordinary methods of filtration of albuminous fluid containing an infective virus are employed, involving moreover the possible retention in the filtrate of antibodies.—I am, etc.,

London, W., Feb. 14th. EDWARD C. HORT.

[1] BRITISH MEDICAL JOURNAL, February 12th, 1916, pp. 224-234

THE ETIOLOGY OF CEREBRO-SPINAL FEVER.

SIR,—I have not the necessary qualifications either to support or to question the very interesting speculation launched by Dr. Edward C. Hort[1] in your issue of January 29th, that the true infective agent of epidemic cerebro-spinal meningitis is a filter-passing organism, and that the meningococcus of Weichselbaum, incapable itself of reproducing the disease, is but a phase in the life-history of a more virulent ancestor.

In that article numerous specimens of the unfiltered body fluids are described as containing the following organisms when submitted to complete examination:

(*a*) The meningococcus of Weichselbaum.
(*b*) The meningobacillus.
(*c*) Clusters of very minute organisms, sometimes diplococcal or diplobacillary in form, at other times of quite indeterminable morphology.
(*d*) Jaeger's diplococcus.
(*e*) Involution forms, diphtheroidal forms, and large bacillary forms.

Now, in so far as certain observations of mine[2] are cited, amongst others, as confirming these findings in their morphological details, may I say that the experiments in question, so far as I am able to judge, do not appear to have the significance attributed to them here?

From what appeared to me to be pure cultures of meningococci isolated from the cerebro-spinal fluid and from the blood of patients in the acute stage of the disease, there developed in subcultures Gram-negative and Gram-positive diphtheroids, bacilli, and diplococci. With a very definite and full reservation as to the possibility of contamination, I suggested that these results, if confirmed, indicated that the meningococcus was a pleomorphic organism. Again, if contamination could be excluded, these findings would indirectly support the thesis, based on other evidence, of some relationship between the meningococcus and an ultramicroscopic filter-passing organism. On the other hand, if it be a fact that the unfiltered body fluids in this disease contain at least five other varieties of micro-organisms, then my own results must be explained by the presence of these secondary organisms as contaminations in the earlier colonies of meningococci.

That seems to be a very possible and probable contingency, which I readily accept, but as a corollary it deprives my observations of any bearing whatever either on the question of pleomorphism or on the more speculative issue regarding the existence of an unknown virus.

More recent observations on changes in a culture of parameningococcus, isolated at the Royal Naval College, Greenwich, from the naso-pharynx of a contact, have increased my scepticism of pleomorphism, the existence of which must either be established or refuted by the final test of animal inoculation.

In conclusion, may I enter a plea, amidst the purely biological research now surrounding the disease, that "the truer and better means of prevention" should not be neglected? This last, when all is said, written, and done, shall be first. For one thing, the necessary measures have the simplicity of being eminently practical.[3] Thus only last week a Brigadier-General wrote: "We had a lot of it (spotted fever) last winter. Yesterday I got my crowd together and talked to them for half an hour about this open air business . . ."

Whatever be the virus it can only exist, develop, and spread under those unhygienic conditions of warm, saturated, impure air too long tolerated by an ignorant civilization, in which unphysiological overcrowding is permitted and legal overcrowding is condemned.

It is clear that under all circumstances and conditions the intelligent recognition of a few simple measures based on physiological laws must inevitably imply that epidemic

[1] BRITISH MEDICAL JOURNAL 1916, i, p. 156.
[2] *Practitioner*, January, 1916, p. 17.
[3] *Lancet*, 1915, ii, p. 862.

cerebro-spinal meningitis will cease to be. It is a sad commentary on so great a possibility that fresh cases of this disease are now appearing.—I am, etc.,

HALLIDAY SUTHERLAND,
Temporary Surgeon R.N.

February 1st.

SEGREGATION OF CONSUMPTIVE SOLDIERS AND OTHERS.

SIR,—At present the tuberculosis dispensaries register increasing numbers of broken soldiers and one hears on all hands of hospitals at home and abroad steadily accumulating cases of pulmonary tuberculosis.

Segregation camps—and the necessary legislation for placing the patients in them—will be urgently necessary, and the sooner the matter is taken in hand the better. With the completion of training of the new army it is reasonable to think that many camps suitable for the purpose will be available, and the necessity of putting up the proposed permanent buildings should not arise.

The problem of segregating the infective consumptives will have to be faced, and will tax all the administrative genius of our empire. Public opinion and the so-called freedom of the subject will have to be reckoned with, and will doubtless make the effectual control of this fell disease more difficult than that of stamping out leprosy in the middle ages. Some old churches exhibit to this day leper squint holes, and bear witness to the part the Church took in the crusade; if need be the religious organizations must be called in to our assistance once more if science and its ancillary legislation fail in the task.—I am, etc.,

J. LEWIS THOMAS,
Tuberculosis Officer for West Monmouth.

Newport (Mon.), Feb. 14th.

THE SOLDIER'S HEART.

SIR,—The letters which have appeared in your columns on the subject of "The Soldier's Heart" and the "Irritable Heart of Soldiers," have brought into prominence two points of practical importance, namely, that the condition under consideration is not peculiar to soldiers who have undergone the strain of modern warfare, and that it may be recognized before they proceed to active service. In respect of prompt recognition it would be difficult to improve on the suggestions of Dr. Stewart Allan Orr.[1]

The syndrome in question has engaged my attention for many years, and was described by me in a communication to your issue of March 8th, 1913, as being one of cardio-vascular atony characterized by mental depression, undue fatigue on exertion or mental concentration, cold and bluish extremities, dicrotic pulse with deficiency or absence of the predicrotic wave, respiratory variations of pulse frequency, postural tachycardia, functional murmurs, and frequently dilatation of the pupils, as well as precordial pain due to fibrositis of certain parts of the chest wall. At the same time I pointed out that the condition is one frequently met with in civil life, especially in children and adolescents, that it is dependent on toxaemia, and is especially liable to assume an acute form in soldiers under the strain of route marching and manœuvres, especially if combined with depressing climatic conditions.

As the suggestions as to treatment have, I think, been somewhat halting and inconclusive, and some have expressed themselves in a tone bordering on hopelessness, I wish to state, as the result of long experience, that a means of cure lies ready to hand. While digitalis and strychnine are of doubtful value, and calcium chloride and adrenalin hydrochloride (orally administered) are often useful as adjuvants, there is no remedy to be compared with the so-called Nauheim methods when administered in this country with judgement and due attention to technical details. As a rule the patient is restored to health, hopefulness, and activity in about two months, and able to resume an active and even arduous life with the keenness and confidence of full vigour. If the toxaemic condition have been successfully dealt with the result may be looked on as permanent.—I am, etc.,

W. BEZLY THORNE.

London, W., Feb. 12th.

THE NOTIFICATION OF MEASLES.

SIR,—You raise some interesting points in your last week's review of the position of practitioners under the new Notification of Measles Order. It will, I believe, become evident as experience is gathered that the effort to limit the expense by barring practitioners from notifying—whether first cases, or cases in the same house wherein one case has been notified within two months—will defeat its own object. Every case notified by a parent or non-medical person must be a doubtful case not yet diagnosed until some medical person has come in to diagnose it. It cannot be necessary to point out the importance of a correct diagnosis being made in this connexion and the occasional difficulty which presents itself in diagnosis even for a much experienced medical practitioner.

The Local Government Board appear to expect the medical officer of health, or some person qualified to make a diagnosis who acts under the instructions of the medical officer of health, to visit the house to make the diagnosis when the notification is by a non-medical person. This will necessitate the case being examined, and then what about its treatment? Is the medical officer of health or his assistant (medically qualified or unqualified) going to take the onus of advising as to treatment? I do not see how he can do that, but I do see from the experience I already have that a good excuse has come into being for parents who desire to save the doctor's fee writing notes to the medical officer of health soliciting visits, and when they learn that the mention of measles enforces a visit their own diagnosis will probably run in this direction. Such visitation from the health department cannot be done without cost; in fact, it seems to me the cost will be greater than if a doctor's certificate were insisted on.

The one and only object, so far as I know, of the notification of measles is to prevent the death of children from the disease, and the one effective advice that I, and as I suppose all other medical officers of health, have been able to give to parents with children so suffering is to call a doctor in, as the disease is dangerous. But now if we are to save as many notification fees as possible we must keep the doctor out, and when we pay our somewhat costly visit (taxi-cabs are rather expensive), we must be sure to impress the parent to tell the doctor as soon as he comes that the medical officer of health has been in and diagnosed the case, and so prevent the payment of the additional half-crown. It has been seriously suggested to me that I should endeavour to forestall the doctor by sending out circular letters to parents living in poor streets where measles cases are known to exist, calling their attention in particular to their obligation to themselves notify any case arising.

But, after all, the medical officer of health will be the worst sufferer in this officially ordered notification of measles. Too little consideration has been given to his position, and the great responsibility thrown upon him, which I anticipate will became manifest from time to time in the coroner's court.—I am, etc.,

J. H. GARRETT, M.D., D.P.H.,
Medical Officer of Health, Cheltenham.

Cheltenham, Feb. 5th.

THE EDUCATION OF NURSES.

SIR,—No one will deny that nursing is a skilled profession or occupation. Does any other exist in which the worker is expected to start work without any preliminary training? The usual routine for the nurse entering as a probationer is to go straight into the wards and start nursing (?) at once. She picks up as much or as little knowledge as the staff nurse or sister has time or inclination to give. She attends a course of lectures, at the end of which she has certain information which she probably needed on the first day in the wards.

The training is given gratuitously, consequently the nurse has no right to complain. If she meets with the disapproval of the sister, there is the possibility that her conduct may be reported to the matron; she may be told she is unsuited for a nurse and her chance of training is at an end, for there is no court of appeal from the matron's word.

Now I hold that no one should be deprived of the right of taking up a course of training and carrying it through. How can any one say after a few months' training (if it is training a probationer gets) whether she is capable or not? Many medical students are slow in learning, and yet become capable at the end, and no one dismisses a student at the beginning of his course of instruction for incapability; why then a nurse? Again, persons qualifying for

[1] BRITISH MEDICAL JOURNAL, February 5th, p. 218.

a profession are usually taught by those chosen on account of special aptitude for imparting instruction. At hospital any staff nurse or sister is called upon to train the probationer regardless of her qualifications as a teacher. There is no systematized instruction in practical work. The lectures are often left to the house-surgeon, house-physician, or resident medical officer, who is chosen for the post with a view to his qualification as a doctor, and not as an instructor of nurses.

The remedy is to start nursing schools in connexion with the hospitals on the same lines as medical schools. In the first place, the training must be paid for, and secondly, the nurse must have an education in nursing. For the first six to twelve months the training should be theoretical, with demonstrations only; the nurse should not go into the wards at all, except for demonstrations. Then the next year or two ward work should be undertaken, still under supervision. The nursing school should also provide special opportunities for public health work, and make arrangements for its students to work at infant consultation centres and with health visitors and school nurses; also for the special branches of nursing—for example, midwifery, massage, electrical, and *x*-ray work.

The curriculum should be laid down and the examinations held by an outside body, who would be entitled to grant certificates (or even a diploma) for general nursing and special certificates for individual branches, particularly midwifery and public health.

A scheme as above outlined would safeguard the profession from a danger which is inevitable in the near future—namely, the flooding of the market with women calling themselves "nurses," whose only training has been a short residence in military hospitals. I have said nothing of the advantages accruing to the patients in hospital from such a scheme.—I am, etc.,

Brixton, Feb. 12th. MILDRED M. BURGESS, M.D.Lond.

SCIENCE, EDUCATION, AND GOVERNMENT.

SIR,—My attention has been drawn to an article on "Science, Education, and Government" in your paper of February 5th. It is impossible to be otherwise than in sympathy with the writer in the purpose of his article, but I hope you will let me point out that the study of natural science is not neglected at the public schools. I have an intimate knowledge of the curricula of two well-known schools. At each of these science—both physics and chemistry—is taught to practically every boy on the modern side, at least four periods in the week being devoted to the subject in the lower sets, and six or seven periods in the higher sets. And at each of these schools not less than 60 per cent. of all boys are on the modern side.

Of the other branches of science mentioned in your article, biology is not generally taught in schools, and geology, which was formerly taught to many army candidates, has—so far as I know—unfortunately dropped out altogether; but the ascertained facts and principles of mechanics and geography are taught, and I think well taught, to modern side boys at all good schools known to me.—I am, etc.,

S. E. LONGLAND,
Glenalmond, Feb. 11th. Warden of Glenalmond.

THE INTRODUCTION OF CINCHONA TREES INTO INDIA.

SIR,—Dr. F. T. Anderson of Horsmonden, Kent, has written to me, and I understand to you also, asking me to correct my attribution of "the whole credit" of the introduction of the quinine trees into India to Sir Clements Markham. Well, I was asked to write on Sir Clements's services in the matter for an obituary notice of him in your last issue [the 12th inst.], and having regard to the limits of space, and the even more pressing dictates of comparative relation, after a brief reference to previous efforts to naturalize these trees in India, I went on to describe in some detail the immediate and unique success of his importation of them from South America into Southern India, being careful to name all those, with one regretful and quite unintentional exception, who assisted him in this specific and crowning undertaking, the exception being Cross the gardener, who, after Sir Joseph Hooker and Sir George Clerk, Markham would have wished me to name; and I concluded with a brief reference to those who, after MacIvor had so wonderfully propagated Markham's trees in the Nilghiris, helped to propagate them elsewhere, in Northern India. I regret that among them I did not mention Dr. Thomas Anderson, particularly as he was a contemporary with me and of mine own age at Edinburgh, where he graduated a year before me. But I was thinking, and deliberately, of Markham's own work in the connexion and under the emotion of his death. He was a thorough English gentleman, of the inborn historical type, developed to its highest mettle under the discipline of service in the Royal Navy; and to this, in simple truth, was entirely due his success in a great benevolent and beneficent adventure wherein there is really no second to stand beside him as first. Had I been writing for an encyclopaedia I certainly should have mentioned Dr. Thomas Anderson; and not only him, but Broughton and Falconer, and Fortune, and John Eliot Howard, and Kasten, and Nassau Lees, and De Vrij; and I hold that after Markham we owe most for the blessing of an exhaustless supply of quinine in India to Howard, the author of *The Quinology of the Indian Plantations*. I am, etc.,

Ealing, W., Feb. 15th. GEORGE BIRDWOOD.

*** A printer's devil, of a hue blacker than usual, transposed the figures giving the age of Sir Clements Markham; he was born on July 20th, 1830; his age was thus 86, and not 68, as printed on p. 247.

LEGAL AND MORAL OBLIGATION.

SIR,—In this discussion I am under the disadvantage, from which you evidently do not suffer, of having at hand neither legal advice nor legal authorities; nevertheless, I stick to my point. I deny that I have confused moral with legal duties, and I contend again that the duty of a citizen to inform the authorities, when he has knowledge of the commission of a criminal offence, is a legal duty and not a moral duty. You say a legal duty is one to which the law will enforce obedience. I agree, provided the law is appealed to. And you say the duty which lies upon ordinary citizens to inform the authorities of a criminal offence is one to which no legal consequences attach. I speak under correction, but I submit that in this you are wrong. The same mistake—that no legal consequences attach to the neglect of duty—was recently made on the same ground, that the law is seldom put into operation, by a man who refused to assist in the arrest of a malefactor when called upon in the King's name by competent authority to do so. That man was indicted for his refusal, and was punished by legal process. Is it to be supposed that a man who could be proved privy to the recent crime of destroying the Government buildings at Ottawa could not be punished for concealing his knowledge? I am much mistaken if he would not be indictable under the common law, and if he would not find the crime of misprision of felony revived for his benefit; and even if this were not so, he could certainly be committed to prison for contempt of court if he refused, in the witness-box, to make the revelation.

You admit that barristers and solicitors are exempt from the duty if the knowledge comes to them from their professional relations with their clients; but you do not say, what is nevertheless the fact, that they are exempted by law. How can they be exempt by law if there is no law which would catch them if they were not exempt? Who brings in a bill of indemnity to absolve him from punishment that he has not incurred, and to which he is not liable? You declare that the duty of the priest to divulge the secrets of the confessional is a moral duty; but you do not venture to declare that the duty of the lawyer, from which he is exempted by law, would, but for this exemption, be a moral duty. Manifestly it would be a legal duty, and if it is a legal duty in his case it is equally a legal duty in the case of the priest and of the ordinary citizen who is neither.—I am, etc.,

Parkstone, Dorset, Feb. 12th. CHAS. A. MERCIER.

*** A person who refuses to assist a police officer in arresting another who is about to commit a breach of the peace is guilty of a breach of a legal duty for which, as is well recognized, he is liable to be indicted. The question whether the law is habitually invoked in order to enforce any given duty has no bearing upon whether such duty is a legal or merely a moral one. The point is, Does the duty rest upon law or merely upon public opinion? If the

former, then it is a legal duty; if the latter, a moral duty and no more.

As was stated in the article on "The Duties of Medical Practitioners in Cases of Criminal Abortion," in the JOURNAL of February 5th and the note to our correspondent's previous letter which was published in last week's issue, there is no legal machinery by which the duty which rests upon ordinary citizens to give information to the authorities in cases where a criminal offence has been committed can be enforced. We therefore called such duty a moral one, and in this we have no doubt.

The position of barristers and solicitors to which our correspondent refers is this: Unlike any other class, barristers and solicitors are "privileged" in that they are not legally compellable—and, indeed, are not by law entitled—to divulge in the witness-box information which they have obtained from their clients. It therefore follows that the ordinary moral duty of the ordinary citizen to inform the authorities does not apply. But for the legal "privilege" which the barrister and solicitor enjoys in the witness-box, his position would be precisely similar to that of any one else. He might or might not be under a moral duty to inform the authorities.

The central fact, however, which emerges from this discussion, and which we wish once again to emphasize, is that it is now established that medical practitioners who obtain information in their professional capacity as to the commission of a criminal abortion are under no duty of any sort or kind to divulge that information to the authorities, and that their duty to their patients enjoins them to preserve professional confidence and secrecy.

Universities and Colleges.

UNIVERSITY OF LONDON.

MEETING OF THE SENATE.

A MEETING of the Senate was held on January 20th.

Clinical Clerks and Surgical Dressers during the War.—It was resolved to admit students who have performed service as clinical clerks or as surgical dressers for not less than six months during the continuance of the war, to the M.B., B.S. Examination after an interval of not less than two and a half years from the date of their passing the second examination for medical degrees in anatomy and physiology, provided that they be not admitted within five and a half years from the date of their matriculation.

Anatomical Nomenclature.—The examiners in anatomy were instructed that no change should be made in the existing nomenclature as used in examination papers without the sanction of the Senate.

The University Medal in Branch IV (Midwifery and Diseases of Women) of the M.D. Examination, December, 1915, has been awarded to Lilias M. Blackett, B.S. (London Royal Free Hospital School of Medicine for Women).

The Lindley Studentship of £100, offered every third year, and a University studentship in physiology, valued £50 for one year, are offered. Full particulars can be obtained from the Academic Registrar.

The Rogers Prize of £100, open to all persons whose names appear on the *Medical Register* of the United Kingdom, will be awarded for an essay or dissertation on "The Nature of Pyrexia and its Relation to Micro-organisms." Essays and dissertations addressed to the Vice-Chancellor must reach the university by 4 p.m. on April 29th.

UNIVERSITY OF ABERDEEN.

AT the meeting of the University Court on February 8th the Senate was requested to draw up conditions of appointment and regulations relative to the lectureship in pathology with special reference to malignant diseases, recently instituted by Sir Alexander M'Robert. Colonel Scott Riddell, senior surgeon to the Royal Infirmary, was appointed general council assessor, in room of the late Dr. Westland.

UNIVERSITY OF GLASGOW.

AT the meeting of the Glasgow University Court on February 10th the Principal, Sir Donald MacAlister, said that 110 women students and graduates at Queen Margaret College had been training to take certificates under the St. Andrew Ambulance Association, in order to act as part-time nurses at hospitals so as to relieve fully trained nurses on military service. A register of women students and graduates, formed to discover reserves of educated women prepared to take on the work of educated men training for military service, showed that 407 out of 438 students had registered themselves. The students and graduates of the university working on munitions numbered 423, and of that number 300 were engaged for the period of the war, many being either unfit for military service or exempted by reason of special circumstances.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary council was held on February 10th, when Sir William Watson Cheyne, president, was in the chair.

A vote of condolence was passed to the relatives of the late Mr. Stanley Boyd, a member of the council.

Diplomas were granted, jointly with the College of Physicians, to four candidates found qualified for the diploma in public health at the recent examinations.

Mr. C. H. Golding-Bird was re-elected to represent the college on the Central Midwives Board.

CONJOINT BOARD IN ENGLAND.

THE diplomas of L.R.C.P. and M.R.C.S. have been conferred upon the following candidates:

J. Andrew, *Mary N. Andrews, G. F. V. Anson, K. L. Bates, T. A. P. Benbow, A. W. C. Bennett, K. H. Bhat, J. T. Bleasdell, E. S. Bowes, *Isabel F. Buckle, A. O. Courtis, D. Crellin, R. G. Dani, P. A. Dargan, L. M. Davies, L. ap I. Davies, H. M. Drake, A. N. Drury, C. Y. Eccles, M. Elias, H. H. Elliot, C. A. L. Evans, D. J. Evans, M. D. Evans, W. J. Evans, C. Gould, H. E. Griffiths, A. B. Gunasekara, C. G. W. Hahr, A. E. Hamlin, W. L. A. Harrison, G. E. Heath, V. R. Hirsch, E. L. Hopkins, *Helen Ingleby, V. C. James, J. G. Jones, L. W. Jones, *Ivy Keess, C. E. Kindersley, M. E. A. Latif, H. Lewis, K. T. Limbery, G. A. S. Madgwick, R. H. Maingot, L. A. Malik, F. W. Maunsell, *Gladys M. Miall Smith, R. D. Moyle, N. R. Nalliah, H. M. Oddy, *May Olivera, *Edith W. Paul, P. R. O'R. Phillips, A. C. Pickett, D. S. Pracy, D. Rees, E. D. Richardson, M. K. Robertson, G. C. Robinson, J. T. Samuel, F. J. P. Saunders, R. J. Scarr, C. P. Sells, G. B. Sellwood, *Edith A. Shaw, *Elsie Stansfeld, A. Sunderland, G. T. Symons, H. J. H. Symons, A. H. Taymour, W. H. Thomas, J. A. Tippett, R. S. Topham, H. M. von Mengershausen, H. J. Wallace, H. A. Whyte-Venables, H. G. E. Williams, A. Wilson, G. C. N. Younger.

* Under the Medical Act, 1876.

The Services.

EXCHANGE DESIRED.

MEDICAL OFFICER attached to Squadron of Royal Engineers wishes to exchange with medical officer holding hospital appointment in England or France.—Address No. 750, BRITISH MEDICAL JOURNAL Office, 429, Strand, W.C.

Obituary.

DR. GEORGE KIRKWOOD died at his residence in Peterborough on January 30th, after a long illness. He was the son of Mr. James Kirkwood, of Dunbar, where he was born in 1852. He was educated in that town and afterwards at the university and the College of Surgeons, Edinburgh. As resident medical officer at the Royal Infirmary he enjoyed the advantage of witnessing the establishment of antiseptic surgery under Lister. He afterwards held the appointment of house-surgeon to the Cumberland Infirmary, Carlisle, and before settling in practice was clinical assistant in the eye wards in the Edinburgh Infirmary. In 1876 Dr. Kirkwood joined Dr. Walker, sen., and Dr. T. J. Walker in Peterborough, and in the following year entered into a partnership with Dr. T. J. Walker which lasted for forty years. He became surgeon to the Peterborough Infirmary, and throughout his long professional career threw his whole heart into his work, more especially attending to the ophthalmic department. Dr. Kirkwood's services to the institution were recognized by a resolution passed, within a few hours of his death, at the hundredth annual meeting of the governors. He was a member of the British Medical Association, and had held the office of President of the Cambridgeshire and Huntingdonshire Branch. Dr. Kirkwood was dextrous as an engineer, a good photographer, and an accomplished pianist, and played on the French horn. He was most liberal in assisting all enterprises, especially musical societies, in which he took part. The funeral, which took place on February 4th, was very largely attended.

WE are indebted to Dr. John Craig for the following notes of the life of Dr. MIDDLETON, who passed away at his residence, 152, Bruntsfield Place, Edinburgh, on February 7th. Robert William Middleton was born at Symington, Lanarkshire, on May 13th, 1853. For a short time he attended school at the neighbouring town of Biggar, and on his parents' removal to Thornhill, Dumfriesshire, continued his school career at Closeburn and at Dumfries Academy. He thereafter studied medicine at Glasgow University, where he received the degrees of M.B., C.M. in 1878. After acting as assistant to the late Dr. John Kello, of Biggar, he spent nine months in Paris

in post-graduate work. In 1888 he settled in London, where he gained a large practice. In 1892 his health gave way, and he was reluctantly compelled to give up work. After spending some time in endeavouring to recover his health at Southsea and at Reigate, he went to reside in Edinburgh about fifteen years ago, and had since been confined to the house and almost entirely to his bed. He was unmarried. Dr. Middleton was beloved by all who knew him. In his retirement he drew around him a small circle of friends who delighted to visit him. His keen appreciation of a good story and his hearty laugh will long be remembered by those who knew him. He was patient during his long illness, and although at frequent intervals he suffered great pain he never complained. On February 10th he was laid to rest beside his parents and grandparents in the quiet churchyard of his native village of Symington under the shadow of the hills he loved so well.

SURGEON-MAJOR-GENERAL JOHN PINKERTON, I.M.S.(ret.), M.D., who died on February 11th, at the age of 83, took the qualifications of M.D.Glas. and L.R.C.S.Edin. in 1855, and became F.R.C.S.Edin. in 1907. He entered the Indian Medical Service in 1855, and served in the Persian war, 1856–7. During thirty-eight years' service in India he held many important posts. From 1868 to 1876 he was superintendent-general of the vaccination department of the Bombay Presidency, and drafted the first Vaccination Bill in India, which became law in 1877. He was in charge of the European General Hospital, Bombay, from 1876 till 1882. He was the first president of the Bombay Branch of the British Medical Association, and had twice held the post of Dean of the Medical Faculty of the University of Bombay, of which university he had been a Fellow since 1868. He was honorary physician to Queen Victoria, and continued as such to King Edward VII and King George V. For five years preceding his retirement he was at the head of the I.M.S. in the Bombay Presidency. At the time of his retirement, in 1893, he was a member of the Legislative Council of the Bombay Presidency. He was the recipient of the good service pension of £100 for meritorious services. In 1894 he was elected F.R.F.P.S.Glas. for distinction in medical science. General Pinkerton lost his only son, Dr. John Pinkerton, in the Russo-Turkish war of 1878. He is survived by an only daughter, the wife of Dr. Ebenezer Duncan, president of the Royal Faculty of Physicians and Surgeons, Glasgow. The funeral took place at Cathcart Cemetery on February 15th.

COLONEL CHARLES FREDERICK POLLOCK, R.A.M.C.(ret.), died at Cowheath, Dumfries, on December 19th, 1915, aged 71. He was born on December 24th, 1844, educated at Trinity College, Dublin, where he took the M.B. and M.Ch. in 1867, and entered the army as assistant surgeon on October 1st, 1867. He became surgeon on March 1st, 1873, surgeon-major on October 1st, 1879, attained the rank of colonel on August 3rd, 1898, and retired on September 7th, 1898. He served in the Egyptian war of 1882, was present at the battle of Tel-el-Kebir, and received the medal with the Khedive's bronze star.

BRIGADE SURGEON JOHN NORMAN DAVIS, R.A.M.C.(ret.), died at Clondarragh, Foxrock, co. Dublin, on December 30th, 1915, aged 77. He was born on October 15th, 1838, the son of the late James Davis, of Millbrook House, Galway, educated at Queen's College, Galway, and took the M.R.C.S. on July 30th, 1862, the M.D. of Queen's University, Ireland, on October 16th, 1862. Entering the army as staff assistant surgeon on April 14th, 1863, he became surgeon on March 1st, 1873, surgeon-major on March 18th, 1877, and retired with a step of honorary rank on April 18th, 1885. The *Army List* assigns him no war service. A great part of his service was spent in India. Since his retirement he had lived for twenty-six years at Clondarragh. He had been a member of the British Medical Association since 1880.

THE LATE MR. STANLEY BOYD.—Lieutenant S. G. Vinter, R.A.M.C., calls attention to Mr. Stanley Boyd's work as a member of the council of Epsom College. He took a keen interest in the success of the school, and did much to raise it to the high position it now holds.

Medical News.

M. GODART, Under Secretary (Health) in the French War Ministry, has addressed a letter to the Wounded Allies Relief Committee, thanking it for the valuable work it has done for wounded French soldiers, especially in maintaining hospitals at Limoges and Dieppe.

A COMMITTEE, with Viscount Hambleden as chairman and Captain H. S. Tunnard as secretary, has been formed to erect a memorial in the chapel of King's College Hospital to Miss Katharine Monk, who was for twenty-one years sister-matron of the hospital.

La Nipiologia (we presume from νήπιος, an infant) is the title of a new Italian quarterly review devoted to the scientific study of childhood, with special reference to the hygiene and medicine of early infancy. The editor is Professor Ernesto Cacace of the University of Naples.

STATISTICS published in German journals show that, as might be expected, there has been a great falling off in the number of foreign students in the universities of Germany owing to the war. Whereas the number in the second semester of 1914 was 4,750, that for the corresponding period of 1915 was 1,305.

THE next course of lectures and discussions arranged by the Child Study Society, London, will begin at 90, Buckingham Palace Road, S.W., on Thursday next at 6 p.m., when Mr. Cyril Burt, psychologist to the London County Council, will speak on psychological problems arising out of the war.

AT the meeting of the Harveian Society of London on Thursday next, at the Stafford Rooms, Titchborne Street, Edgware Road, at 8.30 p.m., a discussion on the treatment of gunshot wounds will be opened by Sir Berkeley Moynihan, and continued by Mr. d'Arcy Power, Mr. Burghard, Mr. Percy Sargent, Mr. Clayton-Green, Dr. Fleming, and others. All members of the profession who may be desirous of hearing the discussion are invited to be present.

THE propaganda of the Pure Food Society is in abeyance during the war, but the National Milk Hostels Committee is doing excellent work, we are informed, in providing poor war mothers with pure milk under the certificate of the society. Medical men and their wives who desire to join the society should apply to the honorary secretary at 67, Jermyn Street, London, S.W.

THE nature and scope of the *Athenaeum Subject Index to Periodicals* were described in a note which appeared in the BRITISH MEDICAL JOURNAL of November 27th, 1915 (p. 799). The first two of the series of class lists, which are later to be incorporated into the annual index for 1915, have appeared. One of these, containing forty-eight pages, relates to the economic, political, and military history of the war, and was issued in January. The other, containing eighty pages, deals with science and technology with special reference to the war. The index, which is issued at the request of the Council of the Library Association, is published by the *Athenaeum*, Bream's Buildings, Chancery Lane, W.C.

A STIRRING appeal for funds on behalf of the French Red Cross has been written by Mr. Dion Calthrop in France. It is entitled *The Wounded French Soldier*, and contains a number of little pictures of French life as it has been transformed, tortured, and ennobled by the war. It is illustrated by a number of photographs showing the ruin of war in all its phases. Mr. Calthrop is a sentimentalist, quick to feel for the sufferer, quick to recognize the virtue of the armour of laughter and firm fortitude with which the French nation has armed itself in the desperate stress of modern warfare. The book, which costs 1s. 6d., should be widely read; the French Red Cross can and does make good use of every penny it receives, and its address is 9, Knightsbridge, London, S.W.

VOL. XV of the clinical series of the *Archives of the Middlesex Hospital* (London, Macmillan and Co.) contains the statistics of the patients treated in the various in-patient departments for the year 1913. In addition, it has an account of a case of systemic haemolysis with haemoglobinuria in a rheumatic woman of 56, by Drs. Pasteur and Whittingham; no note is made as to the presence or absence of Wassermann's reaction. Dr. Ward contributes a paper on the use of the electrocardiograph in the study of the heart muscle, with illustrative electrocardiograms. Brief notes on a few unusual or particularly interesting cases are appended to the report by the pathologist. The volume would, perhaps, gain by the inclusion of a table of its contents.

Letters, Notes, and Answers.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

THE telegraphic addresses of the BRITISH MEDICAL ASSOCIATION and JOURNAL are: (1) EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2631, Gerrard. (2) FINANCIAL SECRETARY AND BUSINESS MANAGER (advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard. (3) MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2634, Gerrard. The address of the Irish office of the British Medical Association is 16, South Frederick Street, Dublin.

☞ *Queries answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

INCOME TAX.

F. has in the past paid income tax on a return arrived at after deducting wear and tear of his car, but for 1915–16 the surveyor of taxes has objected. He inquires whether he is entitled to deduct depreciation, and if not whether he can claim an adjustment of his assessment for 1914–15 in view of the fact that in the year 1913—the last of the average for 1914–15—the cost of renewal of the car exceeded the sum deducted as depreciation.

*** The surveyor appears to be right, that is, the depreciation allowance does not apply to assessments on professions, and therefore the cost of replacement of a practitioner's car can only be dealt with as an expense as and when it is incurred. Presuming that our correspondent had proper notice of the assessment for 1914–15, he is not now entitled to any adjustment. At the same time, we may perhaps point out that he is still entitled to bring the cost into the average for 1915–16 and 1916–17, so that he has lost only one-third of the net cost of replacement, and against that he had the deduction which he made for depreciation for 1914–15.

C. W. S. left South Africa for this country on October 28th last. He inquires as to when he became liable to income tax.

*** It is necessary to distinguish between income arising in this country and income arising abroad. As regards the former, "C. W. S." becomes liable at once—that is, immediately such income is receivable; but as regards the latter, the liability is subject to the conditions laid down in Sec. 39 of the Income Tax Act of 1842—namely, that if he has come to this country for some temporary purpose only, he does not become liable if his stay here does not exceed six months.

THE CHANNEL ISLANDS.

B., who has practised in South Africa, and thinks of settling in the Channel Islands, asks for particulars as to general conditions and those specially affecting medical men.

*** We are indebted to Dr. H. D. Bishop, Secretary of the Channel Islands Division of the British Medical Association, for the following information: Any doctor whose name appears in the current number of the *Medical Register*, and who produces his certificate of registration (not diplomas, etc.) can be admitted to practise by the Royal Court upon paying a fee of £2 10s. A knowledge of French is not necessary, but it is useful in the country districts where the local patois is still spoken, although nearly every one understands English except a few of the old people. Local dialects are very different from ordinary French, and indeed they vary in different islands, and even parishes. The cost of living is much about the same as it is in England. The system of taxation is now being changed, and I cannot say what it will be in the future. Hitherto it has been a tax upon capital and real property, not upon incomes. At present any one could live here for two years without paying any local taxation, but that is going to be altered at once, which is not to be wondered at. People living here have to pay English income tax on investments other than those in the islands. Laws and customs differ in many ways in Jersey and Guernsey, and both have separate governments. No stranger should purchase any property in either island without first consulting a good lawyer, or he may find an apparently straightforward title a valueless one. A wife has certain extraordinary rights upon her husband's property, known locally as her "dower."

DEFORMITY OF THE EXTERNAL EAR.

D. J. G. W. inquires whether any good is likely to follow surgical interference in the case of an infant born with a deformed pinna of the ear, which is folded up and closed over the meatus; no meatus can be felt. In such a case, is there a drum and meatus present?

*** From the literature on the subject it appears that in no case out of sixteen autopsies, on presumably similar cases, was the middle ear normal or a tympanic membrane found. It further appears that embryological, pathological, and clinical observations prove surgical interference to be useless.

LETTERS, NOTES, ETC.

THE COUNTESS OF CHINCHON.

IT will be noticed that in his note last week Sir George Birdwood used the spelling "chinchona." He did so because the name of the countess after whom the genus was named was spelt Chinchon. The official spelling in the *British Pharmacopœia* is "cinchona," and Sir George admits that in all English books the name of the plant is still spelt cinchona. "The right spelling," he characteristically adds, "is every where the wrong spelling of the majority, and wrong the right of the minority."

SEVERE TETANUS SUCCESSFULLY TREATED BY ANTITOXIN.

DR. JAMES ADAM (Hamilton) writes: Captain T. P. Kilner's report (January 8th, p. 46) of a case of recovery from tetanus developing five days after infection and his quotation from the BRITISH MEDICAL JOURNAL report that "if the disease has an incubation period of less than twelve days it is fatal in spite of treatment, whether by antitoxin or other means," recall a note I published in the JOURNAL of November 10th, 1906, of two cases of tetanus. In one the incubation period was ten days, in the other three days; both recovered.

The summary of the first case was: "Numerous dirty wounds; first symptoms on tenth day; first injection of serum on eleventh, last on twenty-second, two abdominal; total, 157 c.cm." The summary of the second case was: "Slight bruise of great toe; first symptom of tetanus by third day; muscles of jaw and spine chiefly involved. First injection of serum on seventh day (subdural), the last on the fourteenth; total, 100 c.cm. Wound swabbed with pure carbolic acid on seventh; required no more dressing."

These and Captain Kilner's case prove that the contention of the BRITISH MEDICAL JOURNAL report is incorrect and support his plea for perseverance in treatment.

*** The quotation in Captain Kilner's communication was taken from a report on the 2nd Eastern General Hospital, Brighton, published in the BRITISH MEDICAL JOURNAL of December 5th, 1914, p. 992.

THE DAILY FOOD RATION OF GREAT BRITAIN.

DR. J. C. MCWALTER (Dublin) writes: Adverting to Professor Thompson's very interesting food figures, published in your issue of February 12th, 1916, p. 239, it surely is a shocking thing to see the Government limiting the supply and raising the price of such invaluable articles of child feeding as sugar and fruit. Unnecessary luxuries are conveyed across the sea to minister to indolence and vice, whilst the scantily-fed child is robbed of the fruit which kept away scurvy, and of the sugar so vital to its growth. And, again, are all our university chemical laboratories incapable of turning out a few hundred pounds of phenacetin or phenazone, or even of sodium salicylate? It is painful to see sick men and women deprived of analgesic drugs, which have almost become a necessity, owing to their high price.

ANDREAS VESALIUS.

BIOGRAPHIST writes: We must all agree with your correspondent, "J. E. (Edinburgh)," in his observation at the end of his paragraph on "The Angulus Ludovici" (JOURNAL, February 12th, 1916), that the student should know something of the men whose names are embedded in anatomy. Let it be remembered, however, that there is considerable difficulty in authenticating their names. Roth of Bâle, in his important biographical work, *Andreas Vesalius Bruxellensis*, published in 1892, shows that Vesalius's family name was not Wessels. "The family of Vesalius was originally called Witing, and was once domiciled in Wesel, in the circle of Cleves; later on it settled in Nymwegen and, in reference to its former home, changed its name into Wesalius. The three weasels (Flemish *wesel*) on Vesalius's coat of arms are a play of words on its origin" (p. 58).

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